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TRANSACTIONS

OF THE

AMERICAN DENTAL ASSOCIATION

AT THE

THIRTY-FIFTH ANNUAL SESSION,

HELD AT

ASBURY PARK, N. J.

COMMENCING ON THE 6th OF AUGUST, 1895.

PUBLICATION COMMITTEE:

GEO. H. CUSHING. E. T. DARBY. A. W. HARLAN.

PHILADELPHIA:
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1896.

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PRESS OF PATTERSON & WHITE,
PHILADELPHIA.

LIST OF OFFICERS FROM DATE OF ORGANIZATION.

PRELIMINARY CONVENTION, NIAGARA FALLS, AUGUST, 1859.

President,	W. W. ALLPORT . . .	Chicago, Ill.
Secretary,	J. TAFT	Cincinnati, Ohio.

ORGANIZATION AND FIRST SESSION OF ASSOCIATION, WASHINGTON, D. C., JULY, 1860.

[Annual meetings to be hereafter, last Tuesday in July.]

President,	W. H. ATKINSON . . .	Cleveland, Ohio.
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Corresponding Secretary,	W. MUIR ROGERS . .	Shelbyville, Ky.
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[NO MEETING IN 1861.]

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Treasurer,	A. C. HAWES . . .	New York City.

NIAGARA FALLS, JULY, 1864.

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2d Vice-President,	H. BENEDICT . . .	Detroit, Mich.
Recording Secretary,	J. TAFT	Cincinnati, Ohio.
Corresponding Secretary,	GEO. W. ELLIS . . .	Philadelphia, Pa.
Treasurer,	I. J. WETHERBEE . . .	Boston, Mass.

CHICAGO, JULY, 1865.

President,	C. W. SPALDING . . .	St. Louis, Mo.
1st Vice-President,	GEO. H. CUSHING . .	Chicago, Ill.
2d Vice-President,	JAS. MCMANUS . . .	Hartford, Conn.
Recording Secretary,	J. TAFT	Cincinnati, Ohio.
Corresponding Secretary,	L. D. SHEPARD . . .	Boston, Mass.
Treasurer,	I. J. WETHERBEE . .	Boston, Mass.

BOSTON, JULY, 1866.

President,	C. P. FITCH	New York City.
1st Vice-President,	W. H. MORGAN	Nashville, Tenn.
2d Vice-President,	L. D. SHEPARD	Boston, Mass.
Recording Secretary,	J. TAFT	Cincinnati, Ohio.
Corresponding Secretary,	A. HILL	Norwalk, Conn.
Treasurer,	W. W. SHEFFIELD	New London, Conn.

CINCINNATI, JULY, 1867.

President,	A. LAWRENCE	Lowell, Mass.
1st Vice-President,	P. G. C. HUNT	Indianapolis, Ind.
2d Vice-President,	A. S. TALBERT	Lexington, Ky.
Recording Secretary,	J. TAFT	Cincinnati, Ohio.
Corresponding Secretary,	C. R. BUTLER	Cleveland, Ohio.
Treasurer,	W. H. GODDARD	Louisville, Ky.

NIAGARA FALLS, JULY, 1868.

President,	JONATHAN TAFT	Cincinnati, Ohio.
1st Vice-President,	HOMER JUDD	St. Louis, Mo.
2d Vice-President,	A. A. BLOUNT	Springfield, Ohio.
Recording Secretary,	EDGAR PARK	St. Louis, Mo.
Corresponding Secretary,	JAS. MCMANUS	Hartford, Conn.
Treasurer,	W. H. GODDARD	Louisville, Ky.

SARATOGA SPRINGS, AUGUST, 1869.*

President,	HOMER JUDD	St. Louis, Mo.
1st Vice-President,	S. J. COBB	Nashville, Tenn.
2d Vice-President,	C. E. FRANCIS	New York City.
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Corresponding Secretary,	I. A. SALMON	Boston, Mass.
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NASHVILLE, AUGUST, 1870.

President,	W. H. MORGAN	Nashville, Tenn.
1st Vice-President,	S. W. DENNIS	San Francisco, Cal.
2d Vice-President,	J. R. WALKER	New Orleans, La.
Recording Secretary,	M. S. DEAN	Chicago, Ill.
Corresponding Secretary,	I. A. SALMON	Boston, Mass.
Treasurer,	W. H. GODDARD	Louisville, Ky.

WHITE SULPHUR SPRINGS, VA., AUGUST, 1871.

President,	GEO. H. CUSHING	Chicago, Ill.
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2d Vice-President,	J. R. WALKER	New Orleans, La.
Recording Secretary,	M. S. DEAN	Chicago, Ill.
Corresponding Secretary,	I. A. SALMON	Boston, Mass.
Treasurer,	W. H. GODDARD	Louisville, Ky.

*Owing to a change in the Constitution, officers elected at this and the sessions following served at the next annual meeting subsequent to their election; and the sessions of and after 1869 commenced on the first Tuesday in August.

NIAGARA FALLS, AUGUST, 1872.

President,	P. G. C. HUNT . . .	Indianapolis, Ind.
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2d Vice-President,	G. A. MILLS . . .	Brooklyn, N. Y.
Recording Secretary,	M. S. DEAN . . .	Chicago, Ill.
Corresponding Secretary,	J. TAFT	Cincinnati, Ohio.
Treasurer,	W. H. GODDARD . .	Louisville, Ky.

PUT-IN-BAY, AUGUST, 1873.

President,	T. L. BUCKINGHAM . .	Philadelphia, Pa.
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2d Vice-President,	J. S. KNAPP . . .	New Orleans, La.
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Corresponding Secretary,	GEO. L. FIELD . . .	Detroit, Mich.
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NIAGARA FALLS, AUGUST, 1875.

President,	A. L. NORTHROP . .	New York City.
1st Vice-President,	H. J. MCKELLOPS . .	St. Louis, Mo.
2d Vice-President,	H. A. SMITH . . .	Cincinnati, Ohio.
Recording Secretary,	C. STODDARD SMITH . .	Springfield, Ill.
Corresponding Secretary,	J. H. MCQUILLEN . .	Philadelphia, Pa.
Treasurer,	W. H. GODDARD . .	Louisville, Ky.

PHILADELPHIA, AUGUST, 1876.

President,	GEO. W. KEELY . .	Oxford, Ohio.
1st Vice-President,	C. N. PEIRCE . . .	Philadelphia, Pa.
2d Vice-President,	CORYDON PALMER . .	New York City.
Recording Secretary,	C. STODDARD SMITH . .	Springfield, Ill.
Corresponding Secretary,	J. H. MCQUILLEN . .	Philadelphia, Pa.
Treasurer,	W. H. GODDARD . .	Louisville, Ky.

CHICAGO, AUGUST, 1877.

President,	F. H. REHWINKEL . .	Chillicothe, Ohio.
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2d Vice-President,	GEO. T. BARKER . .	Philadelphia, Pa.
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Corresponding Secretary,	M. H. WEBB . . .	Lancaster, Pa.
Treasurer,	W. H. GODDARD . .	Louisville, Ky.

NIAGARA FALLS, AUGUST, 1878.

President,	H. J. McKELLOPS . .	St. Louis, Mo.
1st Vice-President,	L. D. SHEPARD . . .	Boston, Mass.
2d Vice-President,	L. D. CARPENTER . .	Atlanta, Ga.
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Corresponding Secretary,	A. O. RAWLS . . .	Lexington, Ky.
Treasurer,	W. H. GODDARD . .	Louisville, Ky.

NIAGARA FALLS, AUGUST, 1879.

President,	L. D. SHEPARD . . .	Boston, Mass.
1st Vice-President,	C. N. PEIRCE . . .	Philadelphia, Pa.
2d Vice-President,	GEO. L. FIELD . . .	Detroit, Mich.
Recording Secretary,	GEO. H. CUSHING . .	Chicago, Ill.
Corresponding Secretary,	M. H. WEBB . . .	Lancaster, Pa.
Treasurer,	W. H. GODDARD . .	Louisville, Ky.

BOSTON, AUGUST, 1880.

President,	C. N. PEIRCE . . .	Philadelphia, Pa.
1st Vice-President,	W. C. BARRETT . . .	Buffalo, N. Y.
2d Vice-President,	GEO. J. FRIEDRICHS . .	New Orleans, La.
Recording Secretary,	GEO. H. CUSHING . .	Chicago, Ill.
Corresponding Secretary,	A. M. DUDLEY . . .	Salem, Mass.
Treasurer,	W. H. GODDARD . .	Louisville, Ky.

NEW YORK, JULY, 1881.

President,	H. A. SMITH . . .	Cincinnati, Ohio.
1st Vice-President,	W. C. BARRETT . . .	Buffalo, N. Y.
2d Vice-President,	GEO. J. FRIEDRICHS . .	New Orleans, La.
Recording Secretary,	GEO. H. CUSHING . .	Chicago, Ill.
Corresponding Secretary,	A. M. DUDLEY . . .	Salem, Mass.
Treasurer,	W. H. GODDARD . .	Louisville, Ky.

CINCINNATI, AUGUST, 1882.

President,	W. H. GODDARD. . .	Louisville, Ky.
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2d Vice-President,	E. T. DARBY . . .	Philadelphia, Pa.
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Corresponding Secretary,	A. W. HARLAN . . .	Chicago, Ill.
Treasurer,	GEO. W. KEELY . .	Oxford, Ohio.

NIAGARA FALLS, AUGUST, 1883.

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Corresponding Secretary,	A. W. HARLAN . . .	Chicago, Ill.
Treasurer,	GEO. W KEELY. . .	Oxford, Ohio.

SARATOGA SPRINGS, AUGUST, 1884.

President,	J. N. CROUSE . . .	Chicago, Ill.
1st Vice-President,	M. W. FOSTER . . .	Baltimore, Md.
2d Vice-President,	C. F. RICH . . .	Saratoga, N. Y.
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Corresponding Secretary,	A W. HARLAN . . .	Chicago, Ill.
Treasurer,	GEO. W. KEELY . .	Oxford, Ohio.

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1st Vice-President,	L. C. INGERSOLL . .	Keokuk, Iowa.
2d Vice-President,	A. T. SMITH . . .	Minneapolis, Minn.
Recording Secretary,	GEO. H. CUSHING . .	Chicago, Ill.
Corresponding Secretary,	A. W. HARLAN . . .	Chicago, Ill.
Treasurer,	GEO. W. KEELY. . .	Oxford, Ohio.

NIAGARA FALLS, 1886.

President,	W. W. ALLPORT . .	Chicago, Ill.
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2d Vice-President,	S. W. DENNIS . . .	San Francisco, Cal.
Recording Secretary,	GEO. H. CUSHING . .	Chicago, Ill.
Corresponding Secretary,	A. W. HARLAN . . .	Chicago, Ill.
Treasurer,	GEO. W. KEELY . .	Oxford, Ohio.

NIAGARA FALLS, 1887.

President,	FRANK ABBOTT . . .	New York City.
1st Vice-President,	CHARLES R. BUTLER . .	Cleveland, Ohio.
2d Vice-President,	T. SOLLERS WATERS . .	Baltimore, Md.
Recording Secretary,	GEO. H. CUSHING . .	Chicago, Ill.
Corresponding Secretary,	FRED. A. LEVY . . .	Orange, N. J.
Treasurer,	GEO. W. KEELY . .	Oxford, Ohio.

LOUISVILLE, KY., 1888.

President,	C. R. BUTLER . . .	Cleveland, Ohio.
1st Vice-President,	A. W. HARLAN . . .	Chicago, Ill.
2d Vice-President,	SAMUEL A. WHITE . .	Savannah, Ga.
Recording Secretary,	GEO. H. CUSHING . .	Chicago, Ill.
Corresponding Secretary,	FRED. A. LEVY . . .	Orange, N. J.
Treasurer,	A. H. FULLER . . .	St. Louis, Mo.

SARATOGA SPRINGS, 1889.

President,	M. W. FOSTER . . .	Baltimore, Md.
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2d Vice-President,	J. D. PATTERSON . .	Kansas City, Mo.
Recording Secretary,	GEO. H. CUSHING . .	Chicago, Ill.
Corresponding Secretary,	FRED. A. LEVY . . .	Orange, N. J.
Treasurer,	A. H. FULLER . . .	St. Louis, Mo.

EXCELSIOR SPRINGS, MO, 1890.

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1st Vice-President,	J. D. PATTERSON . .	Kansas City, Mo.
2d Vice-President,	H. B. NOBLE . . .	Washington, D. C.
Recording Secretary,	GEO. H. CUSHING . .	Chicago, Ill.
Corresponding Secretary,	FRED. A. LEVY . . .	Orange, N. J.
Treasurer,	A. H. FULLER . . .	St. Louis, Mo.

SARATOGA SPRINGS, 1891.

President,	W. W. WALKER . . .	New York City.
1st Vice-President,	J. D. PATTERSON . .	Kansas City, Mo.
2d Vice-President,	S. C. G. WATKINS . .	Mont Clair, N. J.
Recording Secretary,	GEO. H. CUSHING . .	Chicago, Ill.
Corresponding Secretary,	FRED. A. LEVY . . .	Orange, N J.
Treasurer,	A. H. FULLER . . .	St. Louis, Mo.

NIAGARA FALLS, 1892.*

President,	J. D. PATTERSON . .	Kansas City, Mo.
1st Vice-President,	J. Y. CRAWFORD . . .	Nashville, Tenn.
2d Vice-President,	S. C. G. WATKINS . .	Mont Clair, N. J.
Recording Secretary,	GEO. H. CUSHING . .	Chicago, Ill.
Corresponding Secretary,	FRED. A. LEVY . . .	Orange, N. J.
Treasurer,	A. H. FULLER . . .	St. Louis, Mo.

OLD POINT COMFORT, AUGUST, 1894.

President,	J. Y. CRAWFORD . .	Nashville, Tenn.
1st Vice-President,	S. C. G. WATKINS . .	Mont Clair, N. J.
2d Vice-President,	THOMAS FILLEBROWN .	Boston, Mass.
Recording Secretary,	GEO. H. CUSHING . .	Chicago, Ill.
Corresponding Secretary,	EMMA EAMES CHASE .	St. Louis, Mo.
Treasurer,	HENRY W. MORGAN .	Nashville, Tenn.

ASBURY PARK, N. J., AUGUST, 1895.

President,	J. Y. CRAWFORD . .	Nashville, Tenn.
1st Vice-President,	JAMES MCMANUS . .	Hartford, Conn.
2d Vice-President,	THOMAS FILLEBROWN .	Boston, Mass.
Recording Secretary,	GEO. H. CUSHING . .	Chicago, Ill.
Corresponding Secretary,	EMMA EAMES CHASE .	St. Louis, Mo.
Treasurer,	HENRY W. MORGAN . .	Nashville, Tenn.

* The session of 1893, owing to the holding of the World's Columbian Dental Congress, was purely formal, and by resolution was adjourned "without any election of officers, as the effect of such non-election will be, under the Constitution, to make all officers hold over." The officers elected in 1892 thus acted at the regular session of 1894.

EXECUTIVE COMMITTEE FOR SESSION OF 1896.

J. N. CROUSE, Chairman. C. N. PEIRCE, Secretary.

FIRST DIVISION—COMMITTEE OF ARRANGEMENTS.

J. N. CROUSE. *W. W. WALKER. T. S. WATERS.

SECOND DIVISION—ON CREDENTIALS, ETHICS, AND AUDITING ACCOUNTS.

H. A. SMITH. LOUIS OTTOFY. V. H. JACKSON.

THIRD DIVISION—ON VOLUNTARY ESSAYS.

C. N. PEIRCE. *D. N. MCQUILLEN. *S. G. PERRY.

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* These go out August, 1896.

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MINUTES OF TRANSACTIONS

OF THE

AMERICAN DENTAL ASSOCIATION,

SESSION OF 1895.

BY GEORGE H. CUSHING, SECRETARY.

FIRST DAY—MORNING SESSION.

THE AMERICAN DENTAL ASSOCIATION commenced its thirty-fifth annual session in the Auditorium, Asbury Park, New Jersey, at 11 A.M., Tuesday, August 6, 1895; the President, Dr. J. Y. Crawford, in the chair.

Prayer was offered by Dr. N. S. Hoff.

Dr. Sanger briefly and gracefully welcomed the Association on behalf of the New Jersey State Dental Society.

Dr. L. C. Bryan, of Basel, Switzerland, ex-President of the American Dental Society of Europe, was then introduced and made a few appropriate remarks.

The President then introduced Professor L. L. Dunbar, of the University of California.

Dr. Brophy moved that the American Dental Association extend greeting to the American Dental Society of Europe, now in session at Boulogne-sur-Mer, France. Carried.

The roll was then called, and the following were found either to be present or to have forwarded their dues:

ABBOTT, FRANK	22 West Fortieth st., New York.
ADAMS, GEORGE E. . . .	Box 76, South Orange, N. J.
ADELBERG, OSCAR	124 Broad st., Elizabeth, N. J.
AMBLER, H. L.	517 Euclid ave., Cleveland, O.

* Those marked thus were not present, but sent their dues.
d Those marked thus were delegates, but not permanent members.

d APPLETON, J. L.	89 Columbia st., Albany, N. Y.
AYER, J. M.	Raleigh, N. C.
*BAIRD, W. H.	Fourth and Washington sts., Burlington, Iowa.
BARBER, L. L.	311 Summit st., Toledo, O.
BAKER, BOYD H.	605 King st., Wilmington, Del.
BARLOW, F. C.	646 Jersey ave., Jersey City, N. J.
BARRETT, W. C.	208 Franklin st., Buffalo, N. Y.
BARNES, HENRY	106 Euclid ave., Cleveland, O.
d BAUER, JOSEPH	130 Esplanade st., New Orleans, La.
BEESLEY, E. M.	Belvidere, N. J.
BISHOP, J. ADAMS	30 West Forty-eighth st., New York.
BLACK, G. V.	Jacksonville, Ill.
BOGUE, E. A.	63 West Forty-eighth st., New York.
BOICE, ALONZO	1612 Vine st., Philadelphia, Pa.
BOLLINGER, P. S.	Ludlow st., Dayton, O.
BOSWELL, H. H.	322 Franklin st., Buffalo, N. Y.
*BRACKETT, C. A.	102 Touro st., Newport, R. I.
BROPHY, T. W.	126 State st., Chicago, Ill.
BROWN, A. J.	1329 G st., Washington, D. C.
BROWNE, W. G.	75 Peachtree st , Atlanta, Ga.
BROWN, GEORGE C.	Elizabeth, N. J.
BROWN, S. B.	Fort Wayne, Ind.
BROWN, E. PARMLY	1300 Broadway, New York.
BURKHART, H. J.	Batavia, N. Y.
BUTLER, CHAS. R.	334 Euclid ave., Cleveland, O.
BUTLER, CHAS. S.	680 Main st., Buffalo, N. Y.
CANADAY, J. W.	283 State st., Albany, N. Y.
CARR, I. N.	Tarboro, N. C.
CASSIDY, J. S.	Covington, Ky.
*CHAIM, MORRIS L.	Room 18, Cooper Institute, New York.
CHASE, W. G.	40 Nassau st., Princeton, N. J.
CHASE, EMMA EAMES	2602 Locust st., St. Louis, Mo.
CHITTENDEN, C. C.	21 W. Main st., Madison, Wis.
CHITTERLING, N. M.	5 Broad st., Bloomfield, N. J.
d CLANCY, D. W.	S. E. cor. Jay and Seventh sts., Cincinnati, O.
*CLAPP, D M.	62 Trinity Terrace, Boston, Mass.
*CLIFTON, W R.	Waco, Texas.
COCHRAN, G. W.	24 Downing Building, Erie, Pa.
COGAN, WM. N.	2003 H st., Washington, D. C.
COOK, C. D.	133 Pacific st., Brooklyn, N. Y.
*CONRAD, WM.	321 North Grand ave., St. Louis, Mo.
COWARDIN, L M.	Richmond, Va.
COYLE, JOHN H.	Thomasville, Ga.
CRATER, J. L.	224 Main st., Orange, N. J.
CRAWFORD, J. Y.	Jackson Building, Nashville, Tenn.

CRENSHAW, WM.	Atlanta, Ga.
CROUSE, J. N.	2231 Prairie ave., Chicago, Ill.
CRYER, M. H.	1527 Arch st., Philadelphia, Pa.
CULVER, M. B.	1529 Locust st., Philadelphia, Pa.
d CUMMINGS, J. E.	317 South Warren st., Syracuse, N.Y.
CURTIS, GEORGE L.	30 West Fifty-ninth st., New York.
CUSHING, GEORGE H.	31 Washington st., Chicago, Ill.
CUSTER, L. E.	Dayton, O.
DARBY, E. T.	1513 Walnut st., Philadelphia, Pa.
*DAVENPORT, I. B.	30 Avenue de l'Opéra, Paris, France.
DEWEY, S. B.	Cleveland, O.
DILLON, JESSIE B.	813 Race st., Cincinnati, O.
DONNALLY, WILLIAMS	1022 Fourteenth st., Washington, D.C.
*DOUGLASS, B.	Cor. College and Omaha ave., Appleton, Wis.
DUNBAR, L. L.	500 Sutter st., San Francisco, Cal.
DUNN, CHARLES E.	529 Second st., Louisville, Ky.
*DUNN, J. AUSTIN	Suite 901, Marshall Field Building, Chicago, Ill.
ELLIOTT, W. ST. GEORGE	25 West Forty-fourth st., New York.
ESSIG, CHAS. J.	1700 Locust st., Philadelphia, Pa.
FARRAR, J. N.	1271 Broadway, cor. Thirty-second st., New York.
FAUGHT, L. ASHLEY	1415 Walnut st., Philadelphia, Pa.
FIELD, GEORGE L.	Abstract Building, Detroit, Mich.
FILLEBROWN, THOMAS	157 Newbury st., Boston, Mass.
FINLEY, M. F.	1928 I st., N. W., Washington, D. C.
FLAGG, J. FOSTER	Swarthmore, Pa.
FOSTER, M. W.	9 West Franklin st., Baltimore, Md.
FREEMAN, S. A.	641 Main st., Buffalo, N. Y.
FREEMAN, S.	965 Madison ave., New York.
*FREEMAN, A. W.	1208 Venetian Building, Chicago, Ill.
FRIEDRICHS, GEORGE J	155 St. Charles st., New Orleans, La.
*FRIEDRICHS, A. G.	155 St. Charles st., New Orleans, La.
FULLER, A. H.	Columbian Building, St. Louis, Mo.
FUNDENBERG, W. H.	950 Penn ave., Pittsburg, Pa.
FUNDENBERG, W. F.	950 Penn ave., Pittsburg, Pa.
GASKILL, J. HOWARD	1629 Walnut st., Philadelphia, Pa.
GAYLORD, EDWARD S.	932 Chapel st., New Haven, Conn.
GILSON, A. H.	7 Temple Place, Boston, Mass.
GILBERT, S. E.	1627 Columbia ave., Philadelphia, Pa.
GILLETT, HENRY W.	130 Touro st., Newport, R. I.
*GILMER, THOMAS L.	126 State st., Chicago, Ill.
GOLDSMITH, SAMUEL L.	129 East Sixtieth st., New York.
GOODWIN, N. J.	275 Main st., Hartford, Conn.
GRAY, J. P.	27 Berry Block, Nashville, Tenn.
GREGORY, FRANK G.	641 Broad st., Newark, N. J.

GRISWOLD, W. E.	401 Mack Block, Denver, Col.
GROSS, OSCAR J.	Schenectady, N. Y.
GUILFORD, S. H.	1728 Chestnut st., Philadelphia, Pa.
*HACKER, T. S.	28½ East Ohio st., Indianapolis, Ind.
HALEY, META T.	West Chester, Pa.
HARLAN, A. W.	Masonic Temple, Chicago, Ill.
HARVEY, H. T.	44 Euclid ave., Cleveland, Ohio.
*HAYWARD, T. T.	Oneida Building, Minneapolis, Minn.
HARPER, W. E.	3456 Wabash ave., Chicago, Ill.
*HAWES, EARL P.	248 Weybosset st., Providence, R. I.
*HEAD, JOSEPH	1415 Walnut st., Philadelphia, Pa.
*HINKINS, J. E.	131 Fifty-third st., Chicago, Ill.
HITCH, D. M.	Laurel, Del.
HOBLITZELL, C. W.	84½ Bowers st., Jersey City Heights, N. J.
HOFF, N. S.	Ann Arbor, Mich.
HOLBROOK, C. W. F.	Milton Park, Newark, N. J.
HOLLAND, FRANK	Atlanta, Ga.
HOLMES, E. S.	Room 8, New Aldrich Block, Grand Rapids, Mich.
HOW, W. STORER	Cor. Chestnut and Twelfth sts., Philadelphia, Pa.
*HOYSRADT, G. W.	Ithaca, N. Y.
HUEY, ROBERT	330 South Fifteenth st., Philadelphia, Pa.
HULL, HENRY A.	Church st., New Brunswick, N. J.
HUNT, G. E.	Journal Building, Indianapolis, Ind.
*HUNT, P. G. C.	Journal Building, Indianapolis, Ind.
HUNT, A. O.	Iowa City, Iowa.
*HURLBUT, J. S.	Springfield, Mass.
INGLIS, C. S.	Paterson, N. J.
IREDELL, HARVEY	Cor. Church and Nelson sts., New Brunswick, N. J.
JACK, LOUIS	1533 Locust st., Philadelphia, Pa.
JACKMAN, W. T.	106 Euclid ave., Cleveland, Ohio.
JACKSON, V. H.	240 Lenox ave., New York.
JACKSON, H. H.	317 Jefferson ave., Detroit, Mich.
JEFFERIS, C. R.	908 King st., Wilmington, Del.
JEWETT, H. R.	The Grand, Atlanta, Ga.
JOHNS, S. H.	508 King st., Wilmington, Del.
JOHNSON, G. E.	74 Calhoun st., Fort Wayne, Ind.
*JOHNSON, C. N.	31 Washington st., Chicago, Ill.
JONES, DANIEL A.	746 Chapel st., New Haven, Conn.
JONES, VICTOR S.	Bethlehem, Pa.
*KEITH, H. H.	3140 Olive st., St. Louis, Mo.
KESTERSON, R. N.	Cor. Gay and Union sts., Knoxville, Tenn.

KIRK, EDWARD C.	University of Pennsylvania, Philadelphia, Pa.
KNAPP, J. ROLLO	103 Canal st., New Orleans, La.
*KNOWLES, SAMUEL E.	S. E. cor. Post and Stockton sts., San Francisco, Cal.
LEROY, LOUIS C.	226 Fifth st., New York.
*LITCH, WILBUR F.	1507 Walnut st., Philadelphia, Pa.
LUCKEY, B. F.	Paterson, N. J.
LUMMIS, J. F.	Bridgeton, N. J.
MACLEAN, P. A.	Caldwell, N. J.
*MCCANDLESS, A. W.	126 State st., Chicago, Ill.
MCFADDEN, H. B.	3505 Hamilton st., Philadelphia, Pa.
MCKELLOPS, H. J.	2603 Washington ave., St. Louis, Mo.
MCMANUS, JAMES	32 Pratt st., Hartford, Conn.
MCMANUS, HENRY	32 Pratt st., Hartford, Conn.
*MCQUILLEN, DANIEL N.	1628 Chestnut st., Philadelphia, Pa.
MARSHALL, JOHN S.	1012 Venetian Building, Chicago, Ill.
MASCORT, A. E.	97 Prado st., Havana, Cuba.
MAYNARD, F. J.	Englewood, N. J.
*MENG, JOHN W.	Lexington, Mo.
MENGES, THEO.	Cor. Franklin and Madison sts., Chicago, Ill.
MEEKER, C. A.	29 Fulton st., Newark, N. J.
MILLER, HERBERT C.	Oregonian Building, Portland, Ore.
MILLS, WM. A.	122 South Broadway, Baltimore, Md.
MOLYNEAUX, GRANT	S. E. cor. Seventh and Elm sts., Cincinnati, O.
MOORE, J. HALL	104 North Ninth st., Richmond, Va.
*MORGAN, WM. H.	211 North High st., Nashville, Tenn.
MORGAN, HENRY W.	211 North High st., Nashville, Tenn.
*MORRISON, W. N.	1401 Washington st., St. Louis, Mo.
MURLLESS, FREDERIC T., JR.	Windsor Locks, Conn.
*d*NASH, B. C.	113 W. Seventy-eighth st., New York.
NEWBY, JAMES B.	2640 Washington st., St. Louis, Mo.
NOBLE, H. B.	600 Thirteenth st., Washington, D. C.
*NORTHROP, A. L.	57 West Forty-ninth st., New York.
OTTOFY, LOUIS	1228 Masonic Temple, Chicago, Ill.
PATTERSON, J. D.	Keith & Perry Bldg, Kansas City, Mo.
PALMER, CORYDON	Warren, O.
PALMER, JAMES G.	63 West Forty-eighth st., New York.
PALMER, STEWART B.	225 Warren st., Syracuse, N. Y.
PEABODY, FRANCIS	301 West Chestnut st., Louisville, Ky.
PEIRCE, C. N.	1415 Walnut st., Philadelphia, Pa.
PERRY, S. G.	46 West Thirty-seventh st., New York.
*PROSSER, A. J.	1605 Olive st., St. Louis, Mo.
*PRIEST, A. N.	286 Genesee st., Utica, N. Y.
*REMINGTON, F. A.	57 West Forty-ninth st., New York.

RHEIN, MEYER L.	104 East Forty-eighth st., New York.
RICHARDS, W. P.	Orange, N. J.
RICHARDSON, W. E.	101 Main st., Batavia, N. Y.
d RIGGS, C. H.	26 Pratt st., Hartford, Conn.
RILEY, F. EDSALL	474 Broad st., Newark, N. J.
*ROBERTS, NORMAN J.	Waukegan, Ill.
ROHLAND, C. B.	123 Third st., Alton, Ill.
ROUSSEL, A. N.	143 Stuyvesant ave., Brooklyn, N. Y.
SANGER, R. M.	557 Main st., Orange, N. J.
d SCHUBERT, A. A.	Blairstown, N. J.
SEIP, HOWARD S.	Allentown, Pa.
SHEPARD, L. D.	330 Dartmouth st., Boston, Mass.
SHIELDS, NELSON T.	154 Madison ave., New York.
SHOTWELL, F. A.	Rogersville, Tenn.
SHRYOCK, W. W.	27 West Berry st., Fort Wayne, Ind.
SIBLEY, A. H.	800 N. Sixteenth st., Philadelphia, Pa.
SISSON, H. H.	64 West Forty-ninth st., New York
SMITH, B. HOLLY	1009 Madison ave., Baltimore, Md.
SMITH, G. MARSHALL	1009 Madison ave., Baltimore, Md.
SMITH, D. D.	1629 Walnut st., Philadelphia, Pa.
*SMITH, EUGENE H.	383 Dartmouth st., Boston, Mass.
SMITH, H. A.	128 Garfield Place, Cincinnati, O.
*SMITH, H. T.	128 Garfield Place, Cincinnati, O.
SMITH, W. W.	Penn Yan, N. Y.
SOUTHWICK, A. P.	11 Niagara st., Buffalo, N. Y.
SPEAKMAN, W. C.	822 West st., Wilmington, Del.
STAINTON, C. W.	47 North Pearl st., Buffalo, N. Y.
STARR, A. R.	164 East Ninety-third st., New York.
d STELLWAGEN, THOS. C.	Philadelphia, Pa.
STEPHAN, J. T.	157 Euclid ave., Cleveland, O.
SILL, CHARLES	301 West Twelfth st., New York.
STOCKTON, C. S.	15 Cedar st., Newark, N. J.
*STRAIGHT, MILTON B.	80 West Huron st., Buffalo, N. Y.
*STUBBLEFIELD, D. R.	Wilcox Building, Nashville, Tenn.
SUTPHEN, HERBERT S.	24 East Kinney st., Newark, N. J.
SWEENY, A. W.	813 Vermont ave., Washington, D. C.
SWIFT, Z. VIOLA	133 Garfield Place, Cincinnati, O.
TAFT, J.	Berkshire Building, Cincinnati, O.
TAYLOR, L. C.	26 Pratt st., Hartford, Conn.
THOMAS, J. D.	912 Walnut st., Philadelphia, Pa.
THOMPSON, JOHN S.	78½ Whitehall st., Atlanta, Ga.
THOMPSON, A. H.	Topeka, Kan.
TILESTON, H. B.	433 Fourth ave., Louisville, Ky.
TRUEX, W. E.	Freehold, N. J.
TRUMAN, JAMES	3243 Chestnut st., Philadelphia, Pa.
*TURNER, V. E.	107½ Franklin st., Raleigh, N. C.
TWILLEY, W. S.	309 North Eutaw st., Baltimore, Md.

VAN DE WATER, J. N. . . .	Madison, N. J.
VAN VLECK, CHARLES K. . .	936 Warren st., Hudson, N. Y.
WALKER, WILLIAM WALLACE .	58 West Fiftieth st., New York.
WARREN, GEORGE W. . . .	1718 Walnut st., Philadelphia, Pa.
WASSALL, J. W.	208 Dearborn st , Chicago, Ill.
WATERS, T. S.	756 North Eutaw st., Baltimore, Md.
WATKINS, S. C. G.	Montclair, N. J.
WATROUS, O. S.	267 Main st., Middletown, Conn.
WEEKS, THOS. E.	608½ Nicollet ave, Minneapolis, Minn.
d WHITE, W. A.	Phelps, N. Y.
WHITFIELD, GEORGE M. . .	215 South Sixth st., Newark, N. J.
*WHITSLAR, W. H. . . .	29 Euclid ave., Cleveland, O.
*WILLIAMS, JACOB L. . . .	4 Walnut st., Boston, Mass.
WILSON, I. P.	Burlington, Iowa.
WILSON, P. J.	29 Prospect ave., Trenton, N. J.
*WOLF, J. L	1313 Newport ave., Washington, D. C.
WOOLSEY, W.	1162 East Jersey st., Elizabeth, N. J.
WRIGHT, A. M.	38 Third st., Troy, N. Y.
ZELL, E. M.	Little Britain, Pa.

Any inaccuracies in the above list in name or location should be reported to the Treasurer at once, in order that the necessary correction may be made.

Annual dues are payable in advance. No name appears in the above list except those who have paid for 1895, and the Transactions are not sent to any who have not fully paid their dues.

Dues must be paid to the Treasurer Send draft, P. O. money order, or express order.

HENRY W. MORGAN, *Treasurer*, 211 North High st., Nashville, Tenn.

On motion, the reading of the printed minutes was dispensed with.

The Executive Committee made its report of the printed program, amended as to the work for Thursday evening, at which time the papers and lantern exhibits of Drs. Frank Abbott, of New York, and M. H. Cryer, of Philadelphia, had been arranged for at 8 o'clock.

The Publication Committee made the following report, which was referred to the Auditing Committee:

REPORT OF PUBLICATION COMMITTEE.

ASBURY PARK, August 6, 1895.

The Publication Committee would respectfully report that arrangements were made with The S. S. White Dental Manufacturing Company for the publication of the Transactions on the same terms as have heretofore prevailed, and, as usual, we are indebted to Mr. Hise's personal care and attention for the creditable appearance of this last volume.

Their issue was unreasonably delayed for reasons best known to the publishers. One reason assigned was the failure of the Chairman of one of the

Committees to return a revised copy of his report to the publishers for more than a month after it should have been in the publisher's hands. They were mailed, April 8, to all members who were entitled to them, and to honorary members and various libraries as usual.

There was forwarded to the Chairman of the Committee, after the death of Dr. Patrick, a package containing one thousand copies of his report on the examination of pre-historic crania.

Under instructions from Dr. H. A. Smith, Chairman of Section VI, copies were sent in accordance with a list furnished by him, also to all societies, libraries, and honorary members to whom it is customary to mail the Transactions.

Between six and seven hundred copies are still on hand, and your Committee would ask instructions as to the disposition of them.

There are on hand of the Transactions for 1893-4 about sixty copies.

RECEIPTS AND EXPENDITURES.

Received:		
From Treasurer		$60 00
Expended:		
For paper, copying, and stationery	$19 70	
Postage	9 00	
Printing	23 50	
Engrossing	7 50	
Expressage, Patrick's Report	1 90	
		$61 60
Due Publication Committee		$1 60

GEO. H. CUSHING, *Chairman.*

Audited and found correct.

V. H. JACKSON,
LOUIS OTTOFY,
H. A. SMITH,
Auditing Committee.

The Corresponding Secretary's report was then read and referred to the Auditing Committee.

REPORT OF THE CORRESPONDING SECRETARY OF THE AMERICAN DENTAL ASSOCIATION.

ASBURY PARK, N. J., August 6, 1895.

At the request of the President, the Corresponding Secretary sent notices of this meeting to each State and Local Society, reminding them that it was their duty and privilege to send delegates to the American Association, and in this way make our National Association truly representative of the Societies of the country. Notice was also given that blank certificates for delegates would be furnished on application. In response to this about thirty-five Societies have asked for, and been supplied with, blank certificates.

Several communications have been received and forwarded to the proper Committees.

THE AMERICAN DENTAL ASSOCIATION DEBTOR TO EMMA EAMES CHASE, CORRESPONDING SECRETARY.

200 circulars and envelopes	$3 50
500 delegates' certificates	7 50
Postage	4 00
	$15.00

EMMA EAMES CHASE,
Corresponding Secretary, A. D. A.

Audited and found correct.

V. H. JACKSON,
LOUIS OTTOFY, } *Auditing Committee.*

The Treasurer then read his report, which was also referred to the same Committee.

REPORT OF THE TREASURER.

ASBURY PARK, N. J., August 6, 1895.

HENRY W. MORGAN, TREASURER, IN ACCOUNT WITH THE AMERICAN DENTAL ASSOCIATION.

DR.

Balance on hand at last report	$1159 42	
Dues collected at Old Point Comfort	390 00	
" " since	195 00	
		$1744 42
Paid out		1137 49
Balance on hand, August 6, 1895		$606 93

CR.

EXPENDITURES.

Salary of Secretary, 1893-4	$200 00
" " Treasurer, "	100 00
Reporter, session 1894	125 00
Chairman Section I	9 95
" " II.	5 15
" " VI.	4 00
Executive Committee	33 00
Incidentals, Publication Committee	1 15
Expressage, Postage, and Stationery	10 75
Columbian Dental Congress	500 00
The S. S. White Dental Manufacturing Company, Transactions Acct.	88 49
Publication Committee	60 00
	$1137 49

Respectfully submitted,
HENRY W. MORGAN, *Treasurer.*

Audited, found correct, and approved.

H. A. SMITH,
V. H. JACKSON,
LOUIS OTTOFY, } *Auditing Committee.*

The resignations of A. W. McCandless, Dwight Smith, and J. W. Palmer were read and accepted.

An invitation from Dr. H. E. Beach, President of the Southern Dental Association, to this body and its members individually, to meet with them at their annual session to be held in Atlanta the first Tuesday in November, 1895, was then read by the Secretary.

Dr. Watkins, First Vice-President, then took the chair, and the President, Dr. Crawford, read the Annual Address, which was referred to the following committee: Drs. Crenshaw, Fuller, and Walker. Later, Dr. Walker declining to serve, Dr. Fillebrown was appointed to fill his place.

The Committee on Credentials made a partial report, which was subsequently completed as follows:

REPORT OF COMMITTEE ON CREDENTIALS.

Atkinsonian Dental Society of Chicago—Louis Ottofy.

Atlanta Odontological Society—H. R. Jewett.

American Academy of Dental Surgeons of New Jersey—George C. Brown, James G. Palmer.

American College of Dental Surgery—John S. Marshall, Theo. Menges.

Academy of Stomatology of Philadelphia—Robert Huey.

Alumni Society of the Dental Department of the University of Pennsylvania—A. E. Mascort, Boyd H. Baker.

Central Dental Association of Northern New Jersey—Frank G. Gregory, C. W. Hoblitzell, George M. Whitfield, Wm. P. Richards, F. Edsall Riley, W Woolsey, P. J. Wilson, P. A. MacLean, N. M. Chitterling, Charles S. Inglis.

Chicago Dental Club—W. E. Harper.

Chicago Dental Society—J. N. Crouse, Louis Ottofy, A. W. Harlan, T. W. Brophy, C. S. Case, G. V. Black, J. W. Wassall.

Connecticut State Dental Association—Charles H. Riggs, O. S. Watrous, Nelson J. Goodwin, Daniel A. Jones, F. T. Murlless.

Chester and Delaware Counties Dental Society—Meta T. Haley.

Delaware State Dental Society—S. H. Johns, Wm. C. Speakman.

Dental Society of the State of New York—W. A. White, J. L. Appleton, J. E. Cummings, Oscar J. Gross, J. W. Canaday, A. M. Wright, Charles S. Butler, V. H. Jackson, L. C. LeRoy, W. W. Smith.

Eighth District Dental Society—W. E. Richardson, S. A. Freeman.

East Tennessee Dental Association—F. A. Shotwell.

First District Dental Society of the State of New York—B. C. Nash, Henry H. Sisson, Samuel L. Goldsmith, Nelson T. Shields.

Georgia State Dental Society—John H. Coyle, W. G. Browne.

Hayden Dental Society of Chicago—Louis Ottofy.

Harris Dental Association of Lancaster, Pa.—E. M. Zell.

Illinois State Dental Society—Geo. H. Cushing, Louis Ottofy, J. N. Crouse, A. W. Harlan, T W. Brophy, W. E. Harper, C. S. Case, G. V. Black, J. W. Wassall.

Indiana State Dental Association—S. B. Brown, W. W. Shryock, G. E. Johnson.

Isaac Knapp Dental Coterie—S. B. Brown, W. W. Shryock.

Kansas City Dental College—J. D. Patterson.

Kansas State Dental Association—A. H. Thompson.

Kentucky State Dental Association—H. B. Tileston.

Louisiana State Dental Society—Joseph Bauer.

Missouri Dental College—A. H. Fuller.

Mississippi Valley Association of Dental Surgeons—P. S. Bollinger, D. W. Clancy, Jessie B. Dillon, Z. Viola Swift.

Maryland State Dental Association—T. S. Waters, W. S. Twilley, Wm. A. Mills, G. Marshall Smith.

New York Institute of Stomatology—W. St. George Elliott, C. D. Cook, E. A. Bogue.

New Jersey State Dental Society—Geo. E. Adams, Oscar Adelberg, E. M. Beesley, W. E. Truex, J. F. Cummins, F. J. Maynard, Harvey Iredell, A. A. Schubert, J. L. Crater, H. A. Hull.

North Carolina State Dental Society—I. N. Carr, J. M. Ayer.

Oregon State Dental Society—Herbert C. Miller.

Odontological Society of Chicago—Louis Ottofy, T. W. Brophy, J. N. Crouse, A. W. Harlan, C. S. Case, J. W. Wassall.

Ohio College of Dental Surgery—H. A. Smith.

Odontological Society of Pennsylvania—C. N. Peirce, Alonzo Boice, L. Ashley Faught, George W. Warren.

Philadelphia County Dental Society—Alonzo Boice.

Pacific Coast Dental Congress—L. L. Dunbar.

Pennsylvania College of Dental Surgery—C. N. Peirce.

Pennsylvania State Dental Society—G. W. Cochran, S. E. Gilbert.

Philadelphia County Dental Society—Alonzo Boice, C. N. Peirce, J. Foster Flagg.

Philadelphia Dental College—Thos. C. Stellwagen, S. H. Guilford.

Rhode Island Dental Society—Henry W. Gillett.

Richmond City Dental Society—J. Hall Moore.

San Francisco Dental Association—L. L. Dunbar.

Second District Dental Society of the State of New York—A. N. Roussel.

Tennessee Dental Association—F. A. Shotwell, R. N. Kesterson, Henry W. Morgan.

University of California, Dental Department—L. L. Dunbar.

University of Tennessee, Dental Department—J. P. Gray.

University College of Medicine, Dental Department, Richmond, Va.—L. M. Cowardin.

Vanderbilt University, Dental Department—Henry W. Morgan.

Washington City Dental Society—M. F. Finley, A. W. Sweeny, A. J. Brown, Wm. N. Cogan, Henry B. Noble.

Western Reserve University, Dental Department—H. L. Ambler.

On motion, all visiting dentists and physicians were accorded the privileges of the floor.

On motion, the Treasurer was instructed to pay all properly authenticated bills.

Dr. Walker presented the following:

"The Mayor of Asbury Park, Frank L. Ten Broeck, sends his greetings to the members of the American Dental Association, and presents the freedom of the borough to each and every one, with regrets at his inability to be present."

On motion, the following, offered by Dr. Fillebrown, was adopted:

Resolved, That this Association believes the conferring of honorary degrees in dentistry to be detrimental to the profession of dentistry, and hereby expresses its disapprobation of the practice.

On motion, adjourned to meet at 7.30 P.M.

FIRST DAY—EVENING SESSION.

The Association was called to order by Vice-President Watkins at 7.45 P.M., who announced that Dr. Crawford, the President, was seriously ill and unable to be present.

The minutes of the morning session were read and approved.

Under the head of Miscellaneous Business, it was ordered that the consideration of the reports on the "History of the Classification of Dentists by the Census Bureau," and on the "Wells Memorial," be taken up Wednesday at 4 P.M.

On motion, Dr. Harlan's Address was ordered to be read by title and printed in the Transactions. The title is "Antiseptic Surgery."

Section II was called, and Dr. Ottofy read the report.

Dr. Stainton then read his paper, entitled, "Ought the Formation of Dental Schools to be Limited?"

On motion, Dr. Jack read his paper, entitled, "Should Not the Increase of Schools be Restricted?"

On motion, Dr. Barrett's paper was read, entitled, "Whither are We Drifting?"

The subjects of the three papers were then discussed by Drs. Fillebrown, McManus, Stockton, Rhein, Flagg, and Bogue.

The President announced that the Mayor wished to extend to the Association the courtesy of music by the band.

On motion, the discussion of the papers was suspended until to-morrow morning.

The President appointed on the Committee on the President's Address, Dr. Fillebrown, in place of Dr. Walker, who declined to serve.

On motion, adjourned till Wednesday morning.

SECOND DAY—MORNING SESSION.

The Association was called to order by Vice-President Watkins at 9.45 A.M., who announced that Dr. Crawford's condition was much improved, and he hoped to be able to be present this evening.

The minutes of the evening session were read and approved.

A communication from the Dental Society of the State of New York, containing a resolution condemning the use of local anesthetics the formulæ of which are unknown, was referred to the Section on Materia Medica.

On motion of Dr. Walker, a vote of thanks was extended to the Mayor for his courtesies to the Association in presenting to the members the freedom of the borough, and for the musical treat of last evening.

Regular order was then resumed, and the discussion on education was continued by Drs. Stainton, Crouse, Jack, Shepard, Thompson, Truman, H. A. Smith, and Walker.

On motion, the discussion was closed.

Dr. Guilford then read the report of the special committee on "Nomenclature," and was followed by Dr. Molyneaux with a paper on the same subject, who, in turn, was followed by Dr. A. H. Thompson with another paper on the same.

The subject was then discussed by Drs. Black, Stellwagen, Geo. E. Hunt, Guilford, Weeks, Barrett, and Thompson.

On motion of Dr. Marshall, the following was adopted:

Resolved, That the report of the Committee on Nomenclature be received and the Committee continued; also that the list presented by the Committee be submitted to the profession for criticism and suggestions before final action is taken.

On motion, Dr. Black was placed on the Committee on Nomenclature in place of Dr. Stubblefield.

Subject was passed.

A paper entitled "An Opportunity for a Great National Dental Museum and Library," by Dr. Donnally, of Washington, D. C., was then read by Dr. J. D. Patterson.

On motion, thirty minutes was assigned to the discussion of this paper at the afternoon session at 4 P.M.

On motion, the following Committee was appointed to examine the books of the Dental Protective Association of the United States: H. A. Smith, Cincinnati, Ohio; L. D. Shepard, Boston, Mass.; H. B. Noble, Washington, D. C.; L. L. Dunbar, San Francisco, Cal.; H. W. Morgan, Nashville, Tenn.

The organization of Sections was then effected as follows:

ORGANIZATION OF SECTIONS.

SECTION I. Prosthetic Dentistry, Metallurgy, and Chemistry.—R. M. Sanger, chairman; Alonzo Boice, secretary; D. D. Smith, L. E. Custer, H. C. Miller, W. Shaw Twilley, W. G. Chase, C. R. Jefferis, Joseph Head, L. Ashley Faught, Charles A. Meeker, G. M. Whitfield, F. E. Riley, Geo. E. Adams, H. B. McFadden, E. A. Bogue, H. S. Seip, V. S. Jones, E. M. Beesley, F. C. Barlow, C. W. F. Holbrook, Harvey Iredell, J. Rollo Knapp, Geo. Evans, W. T. Jackman, J. N. Crouse, E. S. Gaylord, W. H. Fundenberg, W. N. Morrison, V. H. Jackson, T. S. Waters, A. O. Hunt, Wm. E. Harper,

J. T. Stephan, E. P. Brown, G. W. Cochran, J. N. Van de Water, S. Eldred Gilbert, Henry McManus, A. N. Roussel, H. S. Sutphen, M. L. Chaim, A. W. Freeman, Wm. E. Truex, Chas. J. Essig, B. F. Luckey, L. C. Taylor, S. H. Johns, C. H. Harroun, J. N. Ayer, Oscar Adelberg, Boyd H. Baker, Geo. C. Brown, Walker G. Browne, P. S. Bollinger, Henry Cowie, C. S. Case, C. C. Carroll, Geo. F. Cheney, D. M. Hitch, C. S. Hardy, Frank Holland, Thos. P. Hinman, Frederick Hindsley, J. E. Hinkins, Henry A. Hull, Robt. Huey, G. V. Black.

SECTION II. Dental Education, Literature, and Nomenclature.—Louis Ottofy, chairman; S. H. Guilford, secretary; Grant Molyneaux, A. H. Thompson, M. F. Finley, W. C. Barrett, C. W. Stainton, Louis Jack, G. V. Black, H. B. Noble, Williams Donnally, C. N. Peirce, J. H. Gaskill, Charles P. Pruyn, William E. Harper, Thomas E. Weeks, Frank G. Gregory, Jacob L. Williams, E. S. Holmes, I. N. Carr, C. A. Brackett, Edmund Noyes, C. L. Goddard, M. L. Rhein, J. N. Farrar, Theo. Menges, W. Storer How, C. S. Butler, L. D. Shepard, J. Hall Moore, L. C. Taylor, S. B. Brown, C. R. Butler, J. Adams Bishop, C. D. Cook, James Cleland, J. Y. Crawford, M. B. Culver, William Crenshaw, L. M. Cowardin, J. H. Coyle, J. L. Crater, I. B. Davenport, E. T. Darby, W. H. Morgan, H. J. McKellops, Daniel N. McQuillen, James B. Newby, Francis Peabody, C. B. Rohland, B. Holly Smith.

SECTION III. Operative Dentistry.—A. H. Fuller, chairman; S. C. G. Watkins, secretary; E. A. Bogue, Thomas Fillebrown, J. D. Patterson, S. Freeman, A. E. Mascort, H. W. Gillett, N. T. Shields, J. H. Gaskill, A. J. Brown, A. O. Hunt, William C. Speakman, R. N. Kesterson, S. B. Palmer, J. S. Hurlbut, E. P. Brown, Frank G. Gregory, A. N. Priest, B. Q. Stevens, G. Marshall Smith, S. G. Perry, G. W. Hoysradt, S. A. Freeman, J. N. Van de Water, W. St. George Elliott, W. W Shryock, Wm. P. Richards, S. Eldred Gilbert, Nelson M. Chitterling, H. H Boswell, James McManus, W. H. Baird, F. T. Murlless, A. N. Roussel, H. H. Sisson, W. Woolsey, J. W. Meng, Daniel A. Jones, P. A. MacLean, N. J. Goodwin, C. N. Johnson, J. N. Farrar, L. L. Dunbar, W. F. Fundenberg, H. H. Keith, J. W. Wassall, A. R. Starr, B. F. Luckey, J. Hall Moore, L. C. Taylor, J. M. Canaday, S. H. Johns, J. L. Wolf, Chas. K. Van Vleck, A. J. Prosser, S. B. Brown, C. R. Butler, J. Adams Bishop, Henry Barnes, H. J. Burkhart, Dwight M. Clapp, William Conrad, W. R. Clifton, C. C. Chittenden, I. B. Davenport, E. T. Darby, Chas. E. Dunn, B. Douglas, B. Oscar Doyle, W. H. Dwinelle, G. C. Daboll, J. Austin Dunn, S. B. Dewey, Geo. L. Field, Geo. J. Friedrichs, Robt. Huey, Meta T. Haley, C. W. Hoblitzell, E. P. Keech, R. F. Ludwig, J. S Letord, Louis C. LeRoy, L. W. Lyon, J. F. Lummis, W. H. Morgan, B. J. Maercklein, Robt Maercklein, J. B. Monfort, Thos. T. Moore, F. J. Maynard, H. J. McKellops, Daniel N. McQuillen, Jas. B. Newby, A. L. Northrop, W. E. Page, F. A. Remington, E. H. Smith, Marvin E. Smith, E. A. Stebbins, Chas. Sill, B. Holly Smith, A. P. Southwick, Z. Viola Swift, H. C. Thompson, V. E. Turner, H. B. Tileston, J. S. Thompson, P. J. Wilson, J. N. Crouse, G. V. Black.

SECTION IV. Histology and Microscopy.—Frank Abbott, chairman; I. P. Wilson, secretary; A. O. Hunt, L. L. Dunbar, Jessie B. Dillon, J. W. Wassall, L. L. Davis, C. E. Esterly, C. G. Edwards, E. D. Swain, W. X. Sudduth, A. H. Sibley, George F. Waters, W. A. White, O. S. Watrous, H. Newton Young.

SECTION V. Materia Medica and Therapeutics.—J. S. Cassidy, chairman; George E. Hunt, secretary; E. C. Kirk, L. L. Barber, I. N. Carr, James Truman, Wilbur F. Litch, N. J. Goodwin, William N. Cogan, Jessie B. Dillon, N. S. Hoff, S. L. Goldsmith, J. M. Canaday, S. H. Johns, M. W. Foster, L. C. Ingersoll, C. S. Inglis, H. H. Jackson, G. E. Johnson, H. R. Jewett, Samuel E. Knowles, E. P. Keech, W. W. Walker, George W. Warren.

SECTION VI. Physiology and Etiology.—J. D. Patterson, chairman; L. E. Custer, secretary; T. W. Brophy, H. W. Morgan, W. P. Horton, N. J. Roberts, H. A. Smith, H. T. Smith, W. Storer How, A. W. Sweeny, A. R. Starr, George J. Friedrichs.

SECTION VII. Anatomy, Pathology, and Surgery.—T. W. Brophy, chairman; J. D. Thomas, secretary; William C. Speakman, N. J. Roberts, Frank G. Gregory, W. H. Whitslar, I. N. Carr, F. A. Shotwell, M. L. Rhein, G. Lenox Curtis, J. Taft, S. L. Goldsmith, J. M. Canaday, Arthur B. Freeman, D. A. Floyd, J. Foster Flagg, F. H. Gardiner, T. L. Gilmer, W. E. Griswold, A. H. Gilson, J. P. Gray, O. J. Gross, P. G. C. Hunt, T. S. Hacker, Earl P. Hawes, H. F. Harvey, C. B. Rohland, W. E. Richardson, Eugene H. Smith, C. S. Stockton, E. D. Swain.

On motion, adjourned to meet at 4 P.M.

SECOND DAY—AFTERNOON SESSION.

The Association was called to order at 4.15 P.M.; Dr. Watkins, Vice-President, in the chair.

The minutes of the morning session were read and approved.

Dr. Boice read part of his report on the history of the classification of dentists by the census bureau, when it was moved that the following resolution, which closed his paper, be adopted, and the paper in full be printed in the Transactions.

Carried.

Resolved, That this report be printed in full in the Transactions of 1895; that a copy be sent to the Connecticut State Dental Association, Dental Soci-

ety of the State of New York, Central Dental Association of Northern New Jersey, Pennsylvania State Dental Society, Odontological Society of Pennsylvania, Philadelphia County Dental Society, Maryland State Dental Society, Association of Dental Surgeons, Washington Dental Society, North Carolina State Dental Society, Virginia State Dental Association, National Association of Dental Faculties, Rhode Island Dental Society, and Massachusetts State Dental Society.

The report of the Committee on Horace Wells Memorial was then read by the Chairman, Dr. J. D. Thomas:

MR. PRESIDENT: The Committee upon Anesthesia Celebration would report that, in pursuance of the resolution passed at the meeting of our Association at Old Point Comfort, in 1894, to celebrate the fiftieth anniversary of the discovery of anesthesia by Horace Wells, a meeting was held in the afternoon of December 11, 1894, at Association Hall, in Philadelphia, at which a paper on the history of the discovery of anesthesia was read by Prof. Thos. Fillebrown, of Boston, tending to prove conclusively that the honor and credit of the great discovery belonged to Horace Wells, and through him to the dental profession. A second paper, upon the beneficence of the great discovery to humanity, was presented by Prof. James E. Garretson, of Philadelphia, which was a clear, logical, and scholarly exposition of the topic assigned to him.

Remarks were also made by Dr. G. Q. Colton, who administered the nitrous oxid to Wells on the occasion of the first operation performed under anesthesia, and by Mr. Charles Wells, son of the discoverer, which were valuable contributions to the historical side of the subject.

The meeting was well attended by representative men from different sections of the country.

In the evening a banquet was given, in honor of the event, at the Union League of Philadelphia, at which nearly one hundred and fifty gentlemen, representing fourteen different States of the Union, took part, presided over by Dr. J. Y. Crawford, President of the American Dental Association, with Dr. E. T. Darby as toast-master. Addresses were made by U. S. Senator Hawley, of Connecticut; Colonel A. K. McClure, editor of the Philadelphia *Times;* George S. Graham, District Attorney of Philadelphia; Rev. Dr. S. D. McConnell; Professors H. C. Wood, J. Wm. White, James Truman, and Wilbur F. Litch; Dr. G. Q. Colton, of New York, and Mr. Charles Wells, of Hartford, Conn.

The receipts amounted to $716, with expenses amounting to $946.26, leaving a deficit of $230.26, which has been paid by your Executive Committee.

It is desired that the proceedings and addresses be preserved in a memorial volume, and they have been edited with that object in view. Effort has been made to solicit subscriptions at $1.50 per volume, but as yet we have received but forty subscriptions; and the Committee would here ask that enough members would subscribe to warrant the publication of at least one hundred copies.

During the meeting a resolution was passed that a fund be raised for erecting in Washington a suitable memorial to Horace Wells, J. D. Thomas being elected Treasurer of the fund, and that the President appoint a committee of five to take charge of the matter, and report at this meeting. Dr. Crawford later appointed Professor James Truman, Wilbur F. Litch, S. H. Guilford, Dr. E. C. Kirk, with J. D. Thomas as Chairman.

J. D. THOMAS, *Chairman.*

On motion, it was referred to the Finance Committee.

The discussion on Dr. Donnally's paper being in order, Dr. Finley, of Washington, D. C., offered the following resolution:

Resolved, That this Association formally adopt the Army Medical Museum and Library as the National Museum and Library of the dental profession of the United States.

Discussed by Drs. Crouse, Patterson, Taft, Thomas, Twilley, and Donnally.

The resolution was adopted.

Dr. Donnally offered the following, which was adopted:

Resolved, That a committee of three be appointed by the chair to cooperate with the Army Medical Museum and Library managers in enriching its stores of dental literature and museum specimens, especially by appealing to dental societies and individual members of the dental profession for material assistance.

Dr. Fillebrown, the Second Vice-President, being in the chair, the following were appointed as that committee: Drs. Williams Donnally, J. Taft, and H. J. McKellops. (The Committee was subsequently increased to five, Drs. L. D. Shepard and H. W. Morgan being added to the original committee.)

On motion, adjourned.

SECOND DAY—EVENING SESSION.

The Association was called to order at 8 P.M. by the Vice-President, Dr. Watkins.

The minutes of the afternoon session were read and approved.

Under Miscellaneous Business, Dr. Marshall offered the following as his final report as Treasurer of the World's Columbian Dental Congress:

REPORT OF TREASURER OF WORLD'S COLUMBIAN DENTAL CONGRESS.

IN FULL FROM MARCH 23, 1891, TO JULY 23, 1895.

Receipts.

American Dental Association.	$1000.00	North Carolina	210.25
Illinois State Dental Society	321.00	New South Wales	30.00
Iowa State Dental Society	100.00	North Dakota	40.00
Southern Dental Association.	200.00	New Hampshire	10.00
Washington City Dental Soc.	50.00	Ohio	620.00
Alabama	130 00	Oregon	20.00
Arizona	20.00	Pennsylvania	840.30
Arkansas	20.00	Paraguay	20.00
Austria	10.00	Rhode Island	25.00
California	548.00	Russia	30.00
Canada	20.00	South Dakota	10.00
Connecticut	220.00	South Carolina	130.00
China	30 00	Scotland	20.15
Colorado	40.00	Switzerland	20.00
Chili	10.00	South America	10.00
Cuba	10.00	Spain	20.00
Delaware	50.00	Tennessee	290.00
District of Columbia	190.00	Texas	170.00
England	50.00	Vermont	120.00
France	100.00	Virginia	100.00
Florida	20.00	Washington	80.00
Georgia	125.00	West Virginia	10.00
Germany	10.00	Wisconsin	150.00
Hawaiian Islands	40.00	Amer. Coll. of Dental Surg	10.00
Illinois	3802.00	Baltimore College	10.00
Iowa	460.00	Chicago College	10 00
Indiana	355.00	Columbia University	10.00
Italy	10.00	Louisville Dental College	20.00
Kentucky	120.00	New York Dental College	10.00
Kansas	130.00	Ohio Dental College	10.00
Louisiana	60.00	University of Buffalo	10.00
Maryland	250.00	University of California	10.00
Massachusetts	395.35	University of Minnesota	10.00
Mississippi	40.00	Western Reserve University	10.00
Michigan	245.00	Wilmington Dental Mfg. Co.	40.00
Mexico	20.00	Philadelphia College	10.00
Maine	190.00		
Minnesota	405.00		$15,851.55
Montana	10.00	Amount received from Columbia National Bank	286.06
Missouri	715.00	Donations by Executive Committee	3600.00
Miscellaneous	11.70		
Nebraska	180.00		$19,737.61
New Jersey	477 50		
New York	1515.30		

Disbursements.

General Finance Committee, L. D. Shepard	$926.25
Executive Committee, Secretary's Expenses	3018.84
Treasurer's Expenses	583.59
Treasurer's Bond	100.00
Secretary-General's Expenses	1299.48
State Conference Committee, J. Taft	218.87
Registration Committee, Fred. A. Levy (per G. C. Brown)	34.00
Invitation Committee, W. C. Barrett	16.95
Clinics Committee, C. F. W. Bödecker and S. H. Guilford	80.35
Biology Committee, R. R. Andrews	18.15
Nomenclature Committee, G. V. Black	31.00
History Committee, J. Taft	1523.57
Membership Committee, E. Noyes	13.50
Publication of Transactions Committee, A. W. Harlan	4529.95
Donations by Executive Committee, Traveling Expenses	3600.00
Woman's Department	307 00
S. S. White Dental Manufacturing Company	121.80
Medals	720.00
Buttons and Badges	257.63
Club House	1530.00
Banquet—Deficit	274.60
Refunded Memberships	50.00
Exchange	6.36
	$19,261.89
Paid by Columbia National Bank	286 06
Unpaid by Columbia National Bank	127.09
	$19,675 04
Balance, July 23, 1895, in Merchants' Loan and Trust Co. Bank	62.57
	$19,737.61

JOHN S. MARSHALL, *Treasurer.*

On motion of Dr. Crouse, Dr. L. C. Bryan, of Basel, Switzerland, was elected an honorary member.

The report of the Committee on the President's Address was then read and adopted. It will be found immediately following that address.

Dr. Jack then read his address, entitled, "The Practice of Dentistry."

There being no discussion, Section III was called, and Dr. Jack, Chairman, reported the following papers:

1. The Office and Eccentricities of the Pulp. D. D. Smith.

2. Scientific Filling of Difficult Roots. Nelson T. Shields.

3. Necessity for Better Pulp-Protection, with Methods. J. D. Patterson.

4. The Use of Compressed Air in Operative Dentistry. S. Freeman.

5. Therapeutic Cataphoresis for Obtunding Sensitive Dentine. H. W. Gillett, Newport, R. I.

6. Evolution in Operative Dentistry. S. B. Palmer.

7. Titles of Papers in Operative Dentistry which have Appeared in the Past Year. H. L. Ambler.

Dr. D. D. Smith then read his paper, entitled, "The Office and Eccentricities of the Pulp."

Dr. Patterson read his paper, entitled, "The Necessity for Better Pulp-Protection, with Methods."

Both papers were discussed by Drs. Friedrichs, McKellops, Taft, Truman, Black, Peirce, Crouse, and Stephan.

Dr. Crouse moved that all reports that cannot be read and discussed here, for want of time, shall lie over till next year and not be read by title nor printed.

This motion was laid on the table.

Adjourned till Thursday at 9 A.M.

THIRD DAY—MORNING SESSION.

The Association was called to order at 10 A.M., the Vice-President in the chair.

The minutes of the evening session were read and approved.

Under Miscellaneous Business, the Vice-President, at the request of Dr. Crawford, appointed the following Committee to consider the condition of the mouth and teeth, as bearing upon life insurance: Frank Abbott, C. S. Stockton, J. S. Marshall, T. W. Brophy, and S. G. Perry.

The Secretary presented the paper of Dr. Ambler, from Section III, which the Section requested should be read by title and printed, as follows: "Titles and Number of Articles which have Appeared in Different Journals for the Past Year, pertaining to Operative Dentistry."

On motion of Dr. Taft, Dr. Corydon Palmer was accorded twenty minutes to present what he desired. His time being up, it was extended five minutes, after which the discussion on the papers of Drs. Smith and Patterson was continued by Drs. D. D. Smith, Abbott, Shields, Rhein, McManus, and A. O. Hunt.

On motion, the speakers were limited to five minutes each. No further discussion being had, on motion the writers were allowed five minutes each in which to close, which they did.

Dr. Bryan, of Switzerland, then presented several devices in instruments, and read a brief paper on "New Mat Gold" as a filling-material.

Dr. Shields then read his paper, entitled, "Scientific Filling of Difficult Roots."

Dr. Freeman then read his paper on "The Use of Compressed Air in Operative Dentistry."

On motion of Dr. Taft, the Committee on National Museum was increased to five instead of three.

On motion, adjourned till 7.30 P.M.

THIRD DAY—EVENING SESSION.

The Association was called to order at 7.45 P.M., the Vice-President in the chair.

The minutes of the morning session were read and approved.

Under Miscellaneous Business the following resolution was adopted at the request of Section V:

Resolved, That the American Dental Association condemns the use of secret preparations known as "*local anesthetics*," as well as all other secret preparations.

The Second Vice-President, Dr. Fillebrown, in the chair, appointed to fill the Committee on National Museum, L. D. Shepard and H. W. Morgan.

The following report of the Committee to examine the books of the Protective Association was unanimously adopted:

Your Committee appointed to examine into the financial condition of the Dental Protective Association of the United States beg leave to report: They have carefully examined the books and accounts of the Treasurer, Dr. J. N. Crouse, and find that all funds collected have been accounted for, and all disbursements have been made in the direction of the objects of the Association. We also find the funds on hand have been securely invested.

H. A. SMITH,
L. D. SHEPARD,
H. B. NOBLE,
HENRY W. MORGAN,
L. L. DUNBAR,
Committee.

On motion, Dr. Gillett read a paper entitled "Cataphoresis as an Obtundent of Sensitive Dentine."

Dr. I. P. Wilson then read the report of Section IV, offering two papers, one by Frank Abbott, to be read in connection with a lantern exhibit; another entitled "A Case of Diffused Non-suppurative Lymphadenitis of Dental Origin," by Vida A. Latham, to be read by title only.

Dr. Abbott's paper was then read, with lantern exhibit.

Section VII then presented a lantern exhibit with remarks by Dr. M. H. Cryer, demonstrating some new anatomical discoveries of the superior maxilla.

Discussed by Drs. Barrett, Marshall, Patterson, Thompson, Brophy, Stellwagen, Kirk, McManus. Closed by Dr. Cryer.

On motion, adjourned till 9 A.M. to-morrow.

FOURTH DAY—MORNING SESSION.

The Association was called to order at 9.30 A.M. by Vice-President Watkins.

The minutes of the evening session were read and approved.

Under Miscellaneous Business the Chairman of Section III made the following announcement :

On account of the pressure of necessary matters upon the Association, and the deficiency of time, the Chairman of Section III decides to omit the entertainment of the remaining papers, and asks the Secretary to read by title the paper of Dr. Palmer.

The title of Dr. S. B. Palmer's paper is "Evolution in Operative Dentistry."

The following was adopted :

Resolved, That it is the sense of this Association that the National Association of Dental Faculties can largely control the formation of Dental Colleges, by passing a resolution refusing to admit any college to their Association the organizers of which did not first apply for and obtain permission from the National Association of Dental Faculties to organize such institutions.

The following report of the Executive Committee was adopted :

The Executive Committee, to whom was referred the report of the Committee on the Wells Memorial, would respectfully report that it is the judgment of the Executive Committee that the report be and is hereby referred back to the Memorial Committee.

Your Committee further recommends that this Association appropriate two hundred and fifty ($250.00) dollars for the Memorial of Horace Wells, to be paid upon the completion of the work.

On motion of Dr. Ottofy, the following was adopted :

WHEREAS, Dr. Levitt E. Custer, of Dayton, O., made public his invention of an electric oven for the fusing of porcelain, and demonstrated the process in Chicago, October 4, 1894, and at the Ohio State Dental Society, December 5, 1894 ; and

WHEREAS, Dr. W. H. Taggart, of Chicago, also claims the originality for this invention, but did not make the process public until February, 1895, also exhibiting the oven in May, 1895 ; therefore, be it

Resolved, That it is the sense of this Association that inasmuch as both of these gentlemen are claimants for the honor of the invention, the matter shall be referred to a committee of three, with instructions to investigate it, and to report to this Association at the next annual meeting.

The chair appointed as that Committee the following : Frank Holland, Atlanta, Ga. ; J. G. Palmer, New York city ; Grant Molyneaux, Cincinnati, O.

Section I reported a paper by Dr. Custer, to be read by title, as follows: "The Electric Oven."

The Executive Committee offered the following resolutions, which were adopted:

Resolved, That at the session of the American Dental Association to be held in 1896, the general sessions shall be held every morning, and at such other times as may, at the pleasure of the Association, be designated.

Resolved, That the Sections shall be required to hold separate meetings simultaneously during the day, and that all papers pertaining to the Sections shall be read and discussed in the Sections.

Resolved, That at the *general sessions*, one hour each session shall be devoted to the President's Address, the general addresses prepared by appointment, and such other papers as embrace the results of original investigations, as may be recommended by the appropriate Section.

Resolved, That at the general sessions, reports embracing only a syllabus shall be made of the papers which shall have been accepted at the individual Sections, these reports to be presented by the representative of said Sections; meaning hereby that the work must be done in the Sections.

The following report was adopted:

The Committee on the Union of the American and Southern Dental Associations report progress as follows, and ask for further time.

The Committee have found in our own Association a very general sentiment in favor of a union of the two organizations, with a name and constitution amended to meet the requirements of the present and the progress of the future.

THOS. FILLEBROWN,
LOUIS JACK,
J. N. CROUSE,
J. Y. CRAWFORD,
B. HOLLY SMITH.

Dr. Kirk, Chairman of the Committee on State and Local Societies, offered the following report, which was adopted, and the Committee continued:

To the American Dental Association:

MR. PRESIDENT,—Your Committee on State and Local Organizations desire to submit the following report:

In pursuance of your authorization, copies of the list of topics here appended were forwarded to all of the State and Local Dental Societies of the United States, so far as it was possible to obtain a complete list of their names.

Acceptances were received from the twenty-six Societies whose names are here attached. Reports of the discussions had upon the topics submitted were received from:

The Massachusetts Dental Society.
The New Jersey State Dental Society.
The Kansas State Dental Association.
The Chicago Dental Society.
The Washington City Dental Society.
The Connecticut State Dental Association.

A number of Societies have promised to furnish reports of their work on the topics, who have not done so from lack of time, and these reports will no doubt be received later.

It is proposed by your Committee to refer the reports already received to the appropriate Sections of this Association, to be incorporated in the Section reports for the ensuing year, and for final discussion by this body at its next annual meeting.

From a careful study of the results thus far obtained, and in view of the interest manifested by the representative Societies of the country in the character of the work, your Committee are convinced that this plan, which has been set in operation by this Association, looking to a closer affiliation of the many State and Local Dental Societies of this broad land with the National Dental body, is a most valuable feature, which should be further continued upon the same lines.

Respectfully submitted,

E. C. KIRK, *Chairman.*
LOUIS JACK.
J. N. CROUSE.

LIST OF SOCIETIES WHICH REPLIED TO NOTICE.

The Pennsylvania Society of Dental Surgeons.
The Southern Illinois Dental Society.
The Illinois State Dental Society.
The Iowa State Dental Society.
The North Carolina State Dental Society.
The Connecticut Valley Dental Society.
The New England Dental Society.
The Minneapolis Dental Society.
The Eastern Iowa Dental Society.
The Kansas State Dental Association.
The St. Louis Dental Society.
The Georgia State Dental Society.
The Sacramento Dental Association.
The North Carolina Dental Association.
The Richmond City Dental Society.
The Odontographic Society.
The American Academy of Dental Science.
The Eighth District Dental Society. (Buffalo, N. Y.)
The First District Dental Society of New York. (Not able to discuss topics this year.)

The Seventh District Dental Society of New York.
The Second District Dental Society of New York. (Not able to discuss topics this year.)
The Virginia State Dental Association.
The Rhode Island Dental Society.
The Philadelphia County Dental Society.
The Minnesota State Dental Society.
The Maryland State Dental Association.

Committee on Credentials made their final report, which was adopted.

The report of the Committee on Necrology was adopted, and will be found in the memorial pages.

On motion, Dr. Crouse was granted thirty minutes to present the matters of the Protective Association.

On motion of Dr. Jack, the following was adopted :

WHEREAS, This Association has recognized the importance of the work of the Dental Protective Association of the United States, by having appointed each year a Committee to examine the accounts of the said Association ; therefore,

Resolved, That the American Dental Association recommends each dental society of this country to early appoint one of its members to solicit subscriptions for membership in the Dental Protective Association.

On motion, Section III was passed.

Section V was called, and Dr. Cassidy, Chairman, read the report, and presented a paper by the Secretary, Dr. Geo. E. Hunt, to be read by title, as follows : "A Suggestion about Cocain."

The report was discussed by Drs. Hoff, Gilbert, and Jack, and on motion the subject was passed.

Section VI being called, Dr. Patterson, Chairman, read the report, and presented a paper by Dr. Sweeny, to be read by title, as follows : "Report of a Case in Practice."

The Section was passed.

Section I presented as a supplementary report a paper by Dr. Burchard, on "Some Principles relating to Bridge-Work," to be read by title.

Section VII being called, Dr. Brophy, Chairman, made a brief report.

Dr. Ambler read a paper entitled "Report of a Case."

Dr. Brophy read a paper on "A New Method of Closing the Soft Palate."

Discussed by Drs. Marshall and Brophy.

On motion, proceeded to the selection of the place for next meeting and the election of officers.

Niagara Falls, Saratoga Springs, Lake Minnetonka, and White Sulphur Springs were nominated.

On motion, it was ordered that after the first ballot the highest two, or, in case of a tie, the highest three, shall be considered the nominations.

Saratoga Springs was chosen.

Dr. Stockton moved that in view of the fact of the illness of President Crawford, and his inability to preside at this session, the rules be suspended, and the Secretary be instructed to cast the ballot of the Association for the re-election of Dr. Crawford.

Objection being made, proceeded to take an informal ballot.

The informal ballot showing a majority for Dr. Crawford, it was made formal, and Dr. Crawford declared duly elected.

On motion, a committee consisting of Drs. Friedrichs, Stockton, and Patterson was appointed to wait on Dr. Crawford and communicate to him the result.

The election of the other officers was then proceeded with, resulting as follows:

First Vice-President, James McManus, Hartford.
Second Vice-President, Thomas Fillebrown, Boston.
Recording Secretary, George H. Cushing, Chicago.
Corresponding Secretary, Emma Eames Chase, St. Louis.
Treasurer, Henry W. Morgan, Nashville.

Executive Committee (to serve for three years), J. N. Crouse, Louis Ottofy, V. H. Jackson.

The committee appointed to wait on Dr. Crawford, the President-elect, reported that they were unable to see him, but that his wife sent the assurance of his acceptance.

Dr. Fillebrown read the following communication from Dr. Crawford:

Fellow-Members of The American Dental Association:

Not being able to discharge all my duties as your presiding officer has been one of the most serious disappointments of my life. My only consolation has been in having the two efficient Vice-Presidents, to discharge the duties of the office so acceptably to the body.

I congratulate the Society upon the amount of work accomplished, as has been reported to me by the Chairman of the Executive Committee and other members.

I am grateful to all the officers for the uniform support they have given me for the last twelve months. I am especially thankful to Dr. Emma Eames Chase for her very efficient work as Corresponding Secretary, an office which should be magnified in importance by such faithful services as have been rendered by the present incumbent.

I do hope your Committee to which the union of the American and Southern Societies has been referred will attend the meeting of the Southern in Atlanta in November, at which time, I am certain, a like committee will be appointed from that Association to discuss the grave problem of uniting the two organizations.

In closing my official career, I request that this body, in future, in deed and in truth, become a thoroughly representative body, knowing no North, no South, no East, no West. This cannot be accomplished in any better way than by choosing an active Corresponding Secretary, to look to the appointment of a good, strong delegation of the very best men in the profession in all State and local Societies, to become active members of this Association.

Thanking one and all for the many kindnesses extended to me during my official career, and especially for the tender personal attentions received during my indisposition, I am,

Yours fraternally,

J. Y. CRAWFORD.

On motion of Dr. Donnally, a vote of thanks was extended to Dr. Watkins, First Vice-President, for the efficient manner in which he has presided at this session.

Dr. Fillebrown, Second Vice-President, was called to the chair to represent the installation of the President-elect.

He appointed on the Publication Committee A. W. Harlan and E. T. Darby.

The Local Committee of Arrangements was appointed as follows: Drs. Burkhart, of Batavia, Rich, of Saratoga, and A. M. Wright, of Troy, N. Y.

The President re-appointed the Committee on the Union of the American and Southern Associations, as follows: Thomas Fillebrown, Louis Jack, J. N. Crouse, J. Y. Crawford, and B. Holly Smith.

A vote of thanks was extended to the authorities of Asbury Park, to the Local Committee of Arrangements, and to the New Jersey State Dental Society, for their efforts to make our stay here pleasant and the meeting a profitable one.

The Auditing Committee reported that they had examined the accounts of all the Officers and Committees, and found them correct.

The minutes were then read and approved, and the Association adjourned to meet in Saratoga Springs, the first Tuesday in August, 1896.

GEORGE H. CUSHING, *Secretary.*

REPORT ON NECROLOGY.

J. J. R. PATRICK, D.D.S.

IT becomes our painful duty to place on record the death of our late member, Dr. John Joseph Ravenscroft Patrick, which occurred April 10, 1895, in the sixty-eighth year of his age.

Dr. Patrick was born in Liverpool, England, February 6, 1828, coming to this country with his parents when he was fourteen years of age. His father being a physician, he first selected the profession of medicine, and with that end in view took a course of lectures in McDowell Medical College; but not finding in his medical studies the activity for his marked mechanical ability, which had been greatly developed by an apprenticeship of some years to a jeweler, he commenced the study of dentistry in the office of his brother, and began its practice in St. Louis about 1850. In 1853 he removed to Belleville, Illinois, where, with the exception of three years in the army, he prosecuted his labors in this profession until his death. While Dr. Patrick was, through his studious habits and mechanical appliances, always a prominent figure in dentistry, it was not as a dental practitioner he won his most lasting laurels. His thirst for knowledge and his capacity for unceasing labor made his work in the departments of archeology and ethnology of great value to science and scientific men the world over. His survey and models of the great Cahokia mounds in Illinois are conspicuous in the collections of the Smithsonian Institution, as well as institutions in Europe. In whatever subject he became interested he was a tireless worker, withholding conclusions until every available opportunity had been exhausted for solid and correct judgment. Many monographs in dental and other periodicals are valued because of the care with which every subject was considered. His genial disposition, his modest and unassuming manners, and his invincible courage made him many friends and a prominent figure in all organizations with which he was connected.

He was a member, active or honorary, of many societies, and highly valued for his recognized scientific qualities.

As a fitting memorial to his memory by the members of this

Association, your Committee would recommend that a page in our record book be suitably engrossed with the foregoing, and a copy be sent to his family.

WILLIAM O. KULP, D.D.S.

We have also to make record of the death, on January 13, 1895, of one of the Association's oldest members, Dr. William O. Kulp, who was a member of the National Dental Convention, and on the organization of the American Dental Association became one of its original members. Dr. Kulp was first a student of medicine and medical practitioner, but early abandoned that field for a specialty which offered more definite and congenial labor. He was one of the organizers of the Iowa State Dental Society, and lecturer on dentistry in the medical department of the State University of Iowa; also the first to move in the establishment of its dental department. When this was established, he occupied the position of Professor of Operative Dentistry and Therapeutics, which he held until his death, with the exception of the years 1887 and 1888. A man of public spirit, he held prominent positions under the appointment of the Governor.

His versatile attainments were such that not only has the profession of dentistry lost a valuable member, but the citizens of the commonwealth of Iowa a useful man.

SIR JOHN TOMES, F.R.S., F.R.C.S., L.D.S. Eng., D.D.S.

Recent intelligence from England brings us the sad news of the death of Sir John Tomes, who for thirty years has held connection with the American Dental Association as an honorary member. Mr. Tomes's contributions to the literature of dentistry, in the publication of his works on dental physiology, dental anatomy, and dental surgery, have placed the students in our specialty under lasting obligations, for upon his labors were they for many years almost entirely dependent. In his death not only the profession at large, but American dentistry especially, has lost a valuable contributor.

J. TAFT,
FRANK ABBOTT,
C. N. PEIRCE,
LOUIS JACK.
H. J. MCKELLOPS.

ADDRESS OF WELCOME.

By Dr. R. M. SANGER, President of the New Jersey State Dental Society.

Mr. President, Ladies and Gentlemen, Members of the American Dental Association:

In the name of the New Jersey State Dental Society I salute you—thrice welcome to Asbury Park.

When the dental student begins his course of study, he has before him, as the prize to be won, a diploma; and to obtain that is his sole ambition. With this in view he pursues his course, and when, finally, he receives notice that his efforts have been rewarded, his life has not seen a prouder day. His heart is filled with joy when he holds the valued parchment in his hand; it means so much to him of arduous study and patient persistence in the pursuit of knowledge.

Mr. President, the State Dental Society of New Jersey has this year, as it were, secured a diploma,—the diploma of twenty-five years of usefulness, and a history of which it is proud.

But in a class of dental students there is always one who has a peculiar joy, that of being notified that his is the scholarship prize.

To-day, Mr. President, as we, of this State, look you in the face, we feel that we have attained to the scholarship prize; that in your presence here,—representing, as you do, the intellect, the highest intelligence, the forefront of education in dentistry,—coming here and honoring us with the privilege of being your hosts, you have said to us, Well done! you have given to us the scholarship prize.

We feel a pride in it, because, as a State Society, we have been in the forefront of the battle for higher education.

We believe that we have a reputation as leaders among those who have sought to lift up the profession and make it what it is to-day. And so, sir, our hearts are additionally glad, peculiarly joyful, as we

find this sanction of our work in the acceptance which you have given of our invitation to you to be our guests.

Gentlemen, the latch-string is on the outside to you, and the greatest reward which you can give us while staying here is that we may find your hands often upon the latch-strings of our hospitality, feeling sure that there is nothing you can ask, nothing you can seek, at our hands as hosts, that we will not gladly give. In welcoming you thus, it is with the hope that, while the members of this Association are renewing their mental strength and getting new tools for their work, the air of Asbury Park may bring new lustre to the eye, new quickening to the flow of blood through the veins, so that in the days that pass, as you look back upon your visit here, it will be as looking back upon a beautiful oasis in the desert, to which your hearts shall turn again and again until the impulse shall grow so strong that you will come again among us and be once more our guests.

Again, Mr. President, thrice welcome! We salute you, and rejoice with you to find, in those who love our work, men of real worth, men not misnamed, true manhood-making men: Which is the sum of that which universities attain.

THE PRESIDENT: We have with us to-day a representative of American dentistry in a foreign land, Dr. L. C. Bryan, of Basel, Switzerland, ex-President of the American contingent of dental surgeons in Europe. For three years he was honored with that position, and we should like to have a few words from him.

DR. BRYAN: Mr. President, Ladies and Gentlemen: If Dr. Crawford expects to get a speech from me to-day he is very much mistaken. That is not my forte. I came here, after several years of hard work in our dental society, expecting to be a looker-on, and to have nothing to do. To be called on here upon this bright and pleasant morning, when we all want to enjoy ourselves, is something entirely unlooked for. The only thing I can say to you is that our association in Europe has great pleasure in looking to this Society as to its father. Yours is a much older association than ours. The Society of American Dentists in Europe was formed about twenty years ago, as nearly as I can remember, on the Rigi Mountain, by Americans residing in Switzerland. They gathered together there on the 4th of July to have a little celebration, and organized the American Dental Society, which rapidly grew in numbers and drew to its ranks

the American dentists residing in Europe—in Berlin, Paris, London, Florence, and Milan The whole country, in fact, has contributed to its membership, and all nations of Europe have, in their principal cities, one or more representatives. We meet annually, as you do here, and our society is now in session at Bolougne-sur-Mer, on the coast of France. They charged me to extend to the American Dental Association their greetings, and to express the hope that whenever any of your members are abroad they will arrange to meet with our society, our meeting being held at about the same date as your meeting here. Remember that the date is the first Monday in August, and we, as exiled Americans residing abroad, are always glad to extend the hand of good-fellowship to you. And nothing would please us better than to have you one and all,—yes, we can accommodate you all. Mr. President, I thank you for the honor conferred upon me, and I am glad to be with you to-day.

THE PRESIDENT: We have a very distinguished member of our profession from the far West,—from the great city of San Francisco,—in the person of Professor Dunbar, of the Dental Department of the University of California; and we shall be very glad to hear a few words of encouragement from him.

DR. DUNBAR: Mr. President, Ladies and Gentlemen: I represent only a small part of the great dental profession of this country. We are united by only a very slender bond at present. It appears that the American Association has never gone farther west than the State of Missouri, at least within my recollection. We feel that we have been slighted to some extent. We are not many in numbers, but we have an active working profession in California. We have hoped in the years past to have this Association with us. We now hope that some time in the future you will come over into Macedonia and help us. We need encouragement. There are divisions that need closing up. We think that this sort of assistance is what the American Association ought to furnish.

I am not here to make a speech, which is not my forte; but I thank you, Mr. President, for the distinguished honor of being permitted to speak for my State and city.

ANNUAL ADDRESS.

By J. Y. CRAWFORD, President.

GENTLEMEN OF THE AMERICAN DENTAL ASSOCIATION,—While I am not unmindful of the compliment you paid me at your last meeting, in electing me to the Presidency of this honorable body, I thoroughly appreciate the fact that the great responsibilities fully equal, if they do not exceed, the honor conferred. Therefore, I hope you will permit me to say that what little I have been able to do toward this grand consummation has been with a view to advancing the interests of the American Dental Association. My only desire is that the successful termination of the meeting may be commensurate with my earnest desires for its success.

1. At the last meeting some work was laid out by the appointment of suitable committees, which will come up for consideration at this time. The committee to have charge of the Horace Wells memorial meeting at Philadelphia inaugurated the work by holding a memorial meeting in the city of Philadelphia, on the 11th of December, 1894, at which time it was determined by those in attendance that it was the duty of the dental profession to erect a suitable memorial to the memory of Dr. Horace Wells, as the discoverer of anesthesia.

The notable features of that meeting were the two addresses, delivered by Dr. Thomas Fillebrown, of Boston, Mass., upon the history of anesthesia and its discovery by Dr. Horace Wells, and by Dr. James E. Garretson, upon the advantages resulting from the discovery to surgical science.

In addition to these addresses at the public meeting in Association Hall, there was a memorial banquet arranged by the local committee, under the direction of Dr. J. D. Thomas, at the Union League Building. I recommend that the two public addresses, together with a synopsis of what was said at the banquet, be incorporated in our

annual proceedings, and printed as a part of this year's work of this Association. The results of this meeting go far to demonstrate and to settle the question as to who was the real discoverer of the state known as anesthesia, and not the discoverer of anesthetic agents.

2. A committee, to act as a joint committee with a like committee from the Southern Dental Association, was appointed to investigate the feasibility of bringing together the working material of the two Associations, in order to have one thoroughly national body. As the Southern Dental Association has not held a meeting since our adjournment at Old Point Comfort, Va., I recommend that this committee be continued until our next annual meeting, in order that the Southern Dental Association may have an opportunity, if it so desires, to appoint a like committee.

3. The old question of the representation of dental surgery in the Medical Corps of the Army and Navy demands an earnest and united effort on the part of our profession, and especially by the members of this Association. As the most important specialty in medicine and surgery, we should demand this recognition by the governmental authorities; First, because it is a necessity to the comfort and well-being of those who bear arms in defence of our homes and institutions; second, because of the fact that it is right in every particular, and would be a means of ultimately improving the physical condition of the soldiery of our country,—a question of paramount importance in the make-up of an army of defence.

4. As your presiding officer, I would suggest that the strongest and best committee that can be raised be created, by appointment or otherwise, to investigate the propriety of some inquiry being made in regard to the condition of the mouth and teeth of an individual before obtaining life insurance, as the matter of proper medical examination is of supreme importance in considering the integrity and perpetuity of the life insurance companies of our country. Knowing, as we do, as dental surgeons, how destructive diseases of the mouth and teeth are to human comfort, happiness, and health, it seems passing strange that no attention has been paid to the subject in conducting the medical examination of applicants for life insurance. In addition to the ultimate advantages resulting to the life insurance companies, the moral reflex influence upon the whole community, in calling their attention to the necessity of a proper care of the mouth and teeth, would be farther-reaching, perhaps, than almost any one pronouncement this Association could make at this time. If I am

not right in this claim, I feel certain we should disband as a profession, and engage in other pursuits for a livelihood.

5. Some of our State and Local Societies are attempting to have more attention paid to dental prophylaxis, as regards the children attending school in their communities. I recommend such action by this Association as will further the work on this line; particularly would I insist that we have some discussion, from a dento-mental standpoint, as to the propriety of regulating the time when a child should enter our public schools for instruction at the expense of the public treasury. Permit me here to say that while I am in favor of education in its highest and broadest sense, I am satisfied that the most objectionable form of paternalism, so far as government is concerned, is found along this line, to say nothing of the injury inflicted upon the children of our country from a health standpoint.

Our system of education is sacrificing the teeth and health of our people, by putting the child in school at too tender an age. As I have said before, on other public occasions, I again repeat to this splendid body—the child should not be put to hard study while he is undergoing the process of tooth-shedding and tooth-eruption. The prematurely created nervous strain upon the child, through overtaxing the mind, is much more destructive of proper nutrition and physical development than has yet been conceived of. In my humble judgment, this observation alone should command our thoughtful attention, to say nothing of the injuries resulting to the moral nature of the child by its being deprived of the restrictions of parental oversight and control. I feel certain that this position will be assailed by many within the dental ranks, as well as by many without; but let me say in all candor, if the American people ultimately work out the grave problems of their civilization, and perpetuate themselves beyond the parallel of any preceding civilization in the world's history, this doctrine must, and will, play a conspicuous part in the grand consummation.

Any system of religion or philosophy that addresses itself to the wants of mankind must guard well man's three natures, moral, mental, and physical. If proper dietetic measures, proper mental culture, and proper moral development could be attained to, we should no longer observe the astonishing phenomenon of the hardest and most imperishable portions of the human organism being destroyed, because the teeth would not so readily succumb to disease and destruction. Hence, gentlemen, you will see that the greatest and most

permanent good to mankind is to come through and along the lines of prevention, to the discussion of which I invite your most earnest attention during this meeting, if an opportunity offers.

6. As another means of instruction and advancement in the practical application of dental science to the needs of the people, I respectfully request that this Association, by resolution or otherwise, ask the medical colleges of this country to create or institute special chairs upon the subject of dental and oral surgery,—not nominally, as many schools now do, but *bona fide* chairs,—so that those who expect to graduate in medicine shall be required to know something of the diseases of the mouth and teeth, and the deleterious influences they exert in the impairment of the general health. It is passing strange that so many schools of medicine have *bona fide* chairs on other special branches,—as, for instance, ophthalmology, otology, dermatology, etc.,—and give no attention whatever to the great and important branches of dental pathology and dental surgery; not that medical men are expected to practice dental surgery any more than ophthalmic surgery, but they should have enough information upon the subject to be intelligent in regard to any opinion that might be presented for their consideration by a dental surgeon, or be able to determine, along the lines of differential diagnosis, as to when the mouth and teeth are the primary factors in bringing about constitutional conditions demanding medical attention.

The object of the labors of this Association should be to encourage advancement along the lines which promise the most good to the greatest number. The nation's health and longevity is the question at issue; not the making of money by a favored few. The practical application of dental surgery and dental science is a national necessity.

Many other suggestions could be made with propriety at this time for your careful consideration; but enough for the present. I will now ask your attention to the subject of my address proper,—

ETHICS.

No one question demands more honest, faithful attention at this time than ethics. In fact, the disregard of proper ethical rules of conduct upon the part of men in all lines, business and professional, is a serious menace to our welfare as a people. The only difference between commercial ethics and professional ethics arises from a supposed higher mental attainment of the one class as compared with the

other, and from the interests involved; hence the idea that professional men, in addition to their usual duties, should be teachers, in the highest and best sense, of the most exalted system of ethical conduct. The correction of the many abuses that have come into existence by reason of the disregard of proper ethical usages cannot be accomplished at once. That must be the result of long and persistent effort on the part of such Associations as this, and those of like character in other professions.

Some have suggested the intervention of legal enactment by the various States, in order to put a stop to the nefarious practices of many of our profession who violate the plain teachings of our written code. Such enactments cannot be had until we have a better public sentiment upon the subject, which better sentiment must and can be attained only by utilizing all the forces along the line of proper education. To make myself clear upon this point, let me state that I regard the almost universal practice of the secular press of our country in advertising to the world the innumerable patent medicines without any knowledge of their efficiency, as one of the most glaring and baleful violations of ethical law,—one of the most pernicious in its results, and which should be stopped by the mighty fiat of an intelligent and patriotic public. The proper application of ethical science, as such, demands the same adherence to what is right on the part of those engaged in the work of the press as in other classes or professions. The shameful and regrettable habit of ministers of our various religious bodies, in allowing their names,—and sometimes photographs,—to be placarded before the public as indorsing nostrums, of the contents and therapeutic value of which they have no knowledge whatever, is a potent factor in lessening our high and proper conception, as a people, of what ethics is. It is not uncommon to see written testimonials from prominent officials, presidents, and professors of universities, giving public indorsement to valueless, and even hurtful, patent humbugs as medicinal agents for the relief of disease.

I here state that from a philosophic standpoint, I really believe that of all the evils that afflict our people as a nation, the improper application of remedies, as a result of these unwarranted indorsements, stands at the head of the list. No man has the right under God to assume the functions of another, except in cases of great emergency. Therefore, when the newspaper man, or the clergyman, or the professor, assumes the duties of the doctor, the dentist, or the teacher of

sanitation, he is living in violation of that kind of ethics which should control in the management of the affairs of men.

Ethics in its highest and broadest sense teaches the duties of man to himself, to his fellow-man, to his country, and to his God. Every infraction of ethical law is bound to result in injury to some one, however trivial the violation may be. Taking this as the proper standard of human action, it is an easy matter to determine right from wrong in the affairs of life, a grave question which is not so frequently considered as it should be before engaging in an enterprise for life.

As showing how little attention is paid to the question of ethics, I asked a clergyman upon one occasion to preach me a discourse upon the subject. His reply was, that he had no time for such a discussion, and that if he had, he had no knowledge upon the subject. An advertisement that I saw in a newspaper with his indorsement as to the efficiency of a certain nostrum, as a sure cure for every form of disease to which man is heir, demonstrated to my mind that he was right when he said he did not know anything about the subject. Observations of this character which we make every day go far to show the low standard of ethics in the minds of many professional men. A disregard of the teachings of ethics tends to blunt the moral sensibilities, stupefies the mind, lessens professional pride, and degrades the individual to such an extent that he is no longer suitable for a high and honorable profession.

If the dental surgeons of the United States, or rather the better element, would unite in demanding the enactment of laws which would require of all men proposing to engage in the practice of dental surgery the observance of proper ethical conduct, it would be but a short time before the statute-books of all the States would be graced with enactments which would annihilate the quack and the mountebank, that class of men in dental surgery who have sacrificed more human teeth than all of the honest and capable in our profession have been able to preserve.

Knowing, as we do, the results of all this disregard of what is right and proper in the practice of our profession, should we not speak out upon the subject in no uncertain manner, in order that the people, who are the sufferers, may be protected? To treat of the subject in any other way is waste of valuable time. Therefore I have attempted to deal with the subject from this philosophic standpoint, in order to direct your minds to the root of the evil, and that

some discussion may be had that will strengthen and encourage the weak, that some little may be accomplished in the direction of checking the baneful influence of non-ethical conduct.

If the disregard of ethical conduct continues to increase in the future as it has in the last few years in this country, it may not be long until the old adage, that the pen is mightier than the sword, will be annulled, at least for a time.

As dental surgery is one of the most esthetic professions, it should be the most ethical in its conduct, thus giving the world a noble example of what it is to do right in all things. As an immediate remedy, so far as concerns those who come into the profession from now on through the dental colleges, I would suggest that all of the reputable schools be requested to formulate a uniform oath or obligation, to which each and every student shall subscribe, before a proper State officer, before being permitted to enter the college or receive the degree of Doctor of Dental Surgery. Of course, I do not contend that this would fully stop the evil, but it would lessen it to a great extent. Every violator would be subject to indictment for perjury by the grand juries of our States, and this would deter many from wrong-doing. I would further suggest that this be required of the schools before being eligible to membership by representation in this body. This was originally a custom in general medicine and surgery, and, in my judgment, it was a great mistake when the practice was annulled.

It is my painful duty to call your attention to the fact that some of those who were with us at our last meeting, as members of this Association, have gone to that bourne from whence no traveler returns. Upon the list are the names of two,—Dr. John J. R. Patrick, of Belleville, Ill., and Dr. W. O. Kulp, of Davenport, Iowa,—who have been prominent workers in the interests of the American Dental Association. I recommend that a suitable memorial be prepared and placed upon our record-book in honor of their memory.

REPORT OF SPECIAL COMMITTEE ON PRESIDENT'S ADDRESS.

To the American Dental Association:

YOUR Committee appointed to consider the President's address, and to make report to this body, beg to submit the following:

1. That the American Dental Association adopt the suggestion contained in the address, looking to the erection of a suitable monument to the memory of Horace Wells, in recognition of his bequest to our profession, and also to incorporate in the published Transactions of this meeting the addresses of Drs. Fillebrown and Garretson referred to in the President's address.

2. We recommend the continuation of the committee, appointed to meet and discuss with a similar committee from the Southern Dental Association, the feasibility of bringing together the American and Southern Associations into one body.

3. We recommend further and more persistent effort of this Asso-ation to secure the appointment of dentists in the army and navy.

4. We would also ask the appointment of a well-selected committee to report, twelve months hence, upon the suggestions of the address with reference to the condition of the mouth and teeth, and the bearing this must have in the matter of obtaining life insurance.

5. Your committee regard the suggestion of the paper touching the education of our children as one of great interest and importance, and suggest a further discussion and expression of opinion from this body upon the question.

6. We commend the suggestions of the address to medical colleges, asking the appointment of competent lecturers upon diseases of the mouth and teeth, as a means of good to the clientele of the physician.

7. Your committee regard the suggestions of the address touching professional ethics as furnishing matter for serious reflection, and ask a discussion and expression of opinion from this body with reference to this vexed and important question.

Wm. Crenshaw, *Chairman*,
Thos. Fillebrown,
A. H. Fuller,
} *Committee.*

TOPICS FOR DISCUSSION

BY

State and Local Organizations.

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1. Should not the appointment of Dental Examining Boards be under the control of the State Dental Societies?

2. Should not the granting of certificates of qualification by Examining Boards to non-graduates be generally abolished?

3. To what extent is the washing of amalgam masses an important feature in the production of a good filling?

4. What results are to be expected in replantation or transplantation as a means of treatment of chronic phagedenic pericementitis?

5. The Committee earnestly recommend that the report of the Committee on Dental Nomenclature of the American Dental Association be fully studied and discussed.

LOUIS JACK,
J. N. CROUSE,
EDWARD C. KIRK,
Committee on State and Local Organizations.

GENERAL ADDRESS.

Antiseptic Dental Surgery.

By A. W. HARLAN.

IT would be almost a hopeless task to attempt an address which should cover the whole field of antiseptic surgery as applied to the practice of dental surgery; therefore I shall only try to cover that portion which relates to the surgery of the dental pulp, the pericementum, and the alveolar process, leaving to my auditors the discussion of implantation, surgical lesions of the antrum, nerve-stretching, fractures, removal of tumors, and purely plastic operations.

The dental pulp for many decades has had an absorbing interest for all dentists. Its situation, first of all, is to be considered. The anatomy and histology of the pulp I need not dwell upon. It is not the normal pulp that we are called upon to treat surgically, except in rare instances, but the uncovered pulp, or the pulp which is receding, or the pulp exposed at the apex of a root, or the pulp which is gradually being transformed into spurious dentine, or one with a fungous growth upon it. No matter what the exciting cause,—trauma, or undeftness in the handling of an instrument,—the pulp must be attended to, or the tooth will be lost. What constitutes true antiseptic surgery of the pulp? First, the understanding of antiseptic surgery. "We have seen that it is from particles falling into fluids or on tissues that organisms develop. We have seen that it is only after the access of particles from the outer world to such fluids and tissues that fermentations occur, and we have satisfactorily demonstrated that the particles which cause fermentation and those which give rise to organisms are one and the same; in other words, fermentations are due to the growth of organisms in fluids or tissues. We have also seen that these same laws, with one exception to be presently mentioned, hold good when the fluids or tissues are confined in

the living body, just as when they are in flasks, viz: that the particles which cause putrefaction and other fermentations only rarely enter such substances through the circulation, but generally reach them directly from the air or from surrounding objects; that so long as an animal is healthy, dead fluids or tissues may remain unfermented in closed cavities in the body, and may even entirely disappear, but that as soon as atmospheric air, with its dust, is admitted, organisms develop and fermentations occur. We are now therefore able to take a much wider view of the meaning of the term 'antiseptic surgery' than is generally done. It is no longer surgery which only *excludes* the causes of putrefaction; we may well include under the term *all those methods of wound treatment in which, willingly or otherwise, the growth and fermentative action of the lower forms of organisms (bacteria) are more or less impeded.*"

The above extract, taken from Cheyne's "Antiseptic Surgery," is as true to-day as it was in 1881, after the experience of the Listerian period of fourteen or more years. True antisepsis is always possible in the mouth, but asepsis is in some cases absolutely impossible. In the handling of the dental pulp, whether from the standpoint of its ultimate destruction or that of its possible salvation, the strictest antiseptic precautions are to be observed. All of the contaminating influences are to be excluded. Instruments used are to be sterilized by heat or by the use of agents which will not fail to destroy all particles from the air or moisture that they are brought in contact with. My own observations lead me to the conclusion that the pulp, to be preserved, must be kept from contact with saliva or mixed fluids of the mouth. If water is used on the surface of a pulp, it must be sterilized before such use. Filtration is not sterilization. The water must be boiled, and all instruments, to be thoroughly sterilized, must be cleaned and afterward boiled in a sodium-carbonate solution, two to three per cent., or silico-fluorid, a saturated solution, 1–144. The pulp being in a closed cavity, after exposure by disease or intentionally it is to be removed surgically, with all necessary precautions to insure freedom from infection of the pericementum at the apex of a root, the general principle being that no septic matter should be allowed access to a pulp-canal after the surgical or mechanical removal of a pulp. A recent writer on surgical cleanliness says so many good things in reference to the antiseptic methods, that I shall quote him as a guide for such purely surgical work as may be done by a dental surgeon in or on any portion of the mouth:

"Nothing was known of genuine antiseptic or aseptic surgery until about twenty-five years ago, when Lister made his announcements. Before this time suppuration was not only regarded as unavoidable, but was considered desirable and even necessary, and was encouraged in every way. The connection between fever, blood-poisoning, and suppuration was completely unrecognized.

"Our views and our results, however, have all been changed. Recent statistics from Heidelberg show that out of 222 amputations for all causes, 200 healed by first intention, the other twenty-two being made in cases where suppuration was already present. Even more favorable figures than these have lately been published. What has caused this vast improvement in surgery? Cleanliness. Not the cleanliness of the dining-room or pantry; but surgical cleanliness, which is a totally different thing.

"It has been demonstrated beyond doubt that suppuration, as we ordinarily see it, is due to micro-organisms which swarm about us on every side,—in the air we breathe, the food we eat, and the water we drink; in our mouths, noses, ears, intestinal tract; on our hands, our clothing, our hair; in the dust of rooms—everywhere! Fortunately for us, the most of these microscopic creatures are perfectly harmless; but just as there are poisonous snakes, so there are poisonous bacteria, which are responsible for various diseases, among which are the diseases of wounds.

"To give you an idea of the exceeding minuteness of these micro-organisms, it requires 1500 of them, placed in line, to reach across the head of a pin; or, in other words, one would have to be magnified 1500 times in order to appear as large as a pin-head. If a man were to be magnified the same number of times, he would be as large as Mount Washington.

"These germs multiply with a rapidity beyond all comprehension. A single one, in the course of twenty-four hours, will give origin to five and one-half millions of its kind.

"If we suppose the average depth of all the oceans on the globe to be one mile, and if we suppose a microbe to have a free track with no obstruction to its multiplication, it would require just five days to fill these oceans with its progeny. Luckily for us, however, the conditions are not favorable enough to permit such an inundation of minute life.

"There are healthy wounds and diseased wounds. A healthy wound heals at once; there is no pain, no fever, no inflammation, no suppuration, and practically no redness or swelling—everything goes on as smoothly and nicely as possible. Germs may be present in such a wound; but if they are, they are either harmless germs, or so few in number or so attenuated in virulence that little trouble results.

"As regards the prevention of infection, surgery is divided into two divisions—antiseptic and aseptic. Antiseptic surgery has for its object the destruction of germs already present in a wound; while, by means of aseptic precaution, we endeavor to prevent germs from entering the wound at all.

"It is absurd to consider iodoform or boric acid antiseptics in the sense of their being able to destroy the ordinary germs of infection. I have grown the pus-formers in a mixture of equal parts of iodoform and gelatin.

"Too much dependence is not to be placed in carbolic acid. It may kill the germs on the surface of the wound, but those lying deeper are not affected. I have immersed the Staphylococcus pyogenes aureus, dried on a platinum wire, for half an hour in five per cent. carbolic acid without killing all the germs; I have made similar experiments with the same micro-organism mixed with blood and dried into the seams of instruments. As to the efficacy of carbolic acid in cleaning an infected wound, I think it is doubtful, to say the least. The albumin of the tissues coagulates rapidly, thus protecting the parts beneath. The same thing is true in a still greater degree of bichlorid of mercury. . . . .

"Everything must be surgically clean, that is, as nearly as possible free from bacteria; not only the instruments and dressings employed, but the hands of the surgeon and his assistants, and the skin of the patient to be operated upon. These things must be kept clean, and not be permitted to touch anything that is not as clean as themselves. This rule is absolute, but unfortunately it is frequently broken—the surgeon will feel the patient's pulse, adjust his glasses, shake hands with a friend, touch his own or another's clothing, lay his knife on a table, or do something else which he should not do, thus picking up, perhaps, hundreds of waiting pus-formers, and destroying the force of all his previous and subsequent precautions.

"There are a number of methods of preparing the hands. I shall give you but one, which is, however, as effective as others which are more elaborate:

"First. Soak the hands thoroughly in warm soap-suds, at the same time scrubbing them thoroughly with a good stiff-bristle brush, especially about the nails, knuckles, and creases in the skin.

"Second. Dry the hands and then carefully clean the nails, the dirt beneath them having been well softened by the previous soaking.

"Third. Soak and rub the hands thoroughly in alcohol, the object being to remove oily substances from the skin, so that the antiseptic which is subsequently employed may be as efficacious as possible.

"Fourth. Soak and scrub well in a 1 to 1000 solution of bichlorid, pressing the bulbs of the fingers against the bottom of the dish, so as to permit the antiseptic to get thoroughly beneath the nails.

"Remember, however, that the scrubbing in soap-suds probably accomplishes much more than the soaking in bichlorid, the latter solution serving principally as a rinsing-fluid. Those germs which cannot be removed with brush may or may not be destroyed by an antiseptic, usually the latter.

"Again, it must be remembered that it is an exceedingly difficult matter to remove all bacteria from the hands—only the more superficial ones are dislodged. The few which remain are so firmly adherent, so well concealed between the epithelial cells and in cracks and creases of the skin, that they will not become loosened during an operation.

"The preparation of the field of operation is perhaps of as much importance as any other step in surgical cleanliness. Hands and instruments come in contact with the wound for but a brief period, but the skin must be more

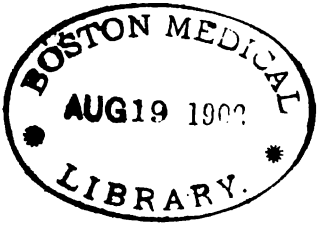
or less bathed in the wound-secretions for a much longer time, during which there is always danger of infection. . . . .

"Simply immersing instruments in bichlorid or in carbolic acid is not effective. I have placed infected instruments in a five per cent. solution of carbolic acid for half an hour without rendering them sterile, and the same may be said of corrosive sublimate. The latter will also tarnish instruments badly. The best method is to boil the instruments in a one per cent. solution of carbonate of sodium. The boiling, in spite of what has been said to the contrary, does not injure the edges of knives, especially if they have been wrapped in cotton. After boiling there is no necessity for placing instruments in carbolic acid or any other solution—they are already sterile. It is more convenient in every way to arrange them dry on a sterilized towel, covering them with another towel until ready for use.

"Five or ten minutes' thorough boiling is enough—no pathogenic germ can live after that. It is not necessary to boil for half an hour or longer, as is often advised."—LEONARD FREEMAN, B.S., M.D., *Pacific Record of Medicine and Surgery.*

The surgery of the pericementum and that of the alveolar processes are so nearly allied that we will consider both subjects together. The pericementum, the delicate membrane which covers the roots of all teeth, is the subject of much anxiety not only to the dentist, but also to the patient. Neglect to use the proper and necessary precautions in removing the pulp, or in the subsequent cleansing of the canal, will lead to much suffering and frequently eventuate in the loss of one or more teeth and even portions of the process, as well as of the maxilla itself. All operations on the roots of teeth under the gum and between the tooth-root and the alveolar process will be more uniformly successful when they are made with surgically clean knives, burs, gouges, and scraping instruments. No syringe-point should be introduced into the pericementum or the gums that is not surgically clean. Dirt, grease, dried blood, mucus, pus, or any septic matter adhering to a needle will not be rendered aseptic by the soaking in any strength solution of a chemical disinfectant, unless it destroys such substances as fire will. Superheated steam, cooking in an oven, may do the work, but the instruments must first of all be cleaned. Such dressings as are used in the mouth should be made of gauze, impregnated with boracic acid (new), iodoform, or iodine solutions, and according to the consensus of the best surgical authors extant, such dressings should be as dry as possible. All operations that can be made as nearly bloodless as possible are to be considered most favorable. Moisture, which is hard to exclude from the mouth and around the jaws, is a *bête noire* for the dental surgeon. It is on this

account that the teachings of aseptic surgery cannot be fully utilized in oral operations. The day has long passed, I hope, when the methods of the primitive dental surgeon are to be copied by his successors. A new era has come, and it is the duty of every surgeon to practice antiseptic surgery to the fullest possible extent, and to make and keep records of such work, to encourage others to do likewise for the benefit of our fellow-men.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SECTION II.

DENTAL EDUCATION, LITERATURE, AND NOMENCLATURE.

REPORT BY LOUIS OTTOFY, CHAIRMAN OF THE SECTION.

MR. PRESIDENT AND GENTLEMEN: The Section on Dental Education, Literature, and Nomenclature begs leave to offer the following as its annual report:

I. Education.

It has been the custom of this Section since 1887 to report annually the number of dental colleges in active operation in the United States. At the close of the session of 1894 the total number of colleges in operation and granting degrees was forty-seven. There have been established since that time two dental colleges,—the Dental Department of the University of Omaha, and the Dental Department of the Baltimore Medical College,—and one discontinued (the German-American Dental College); leaving a total of forty-eight dental colleges now in active operation and granting degrees.

The following is the number of "Matriculates," "Students in Attendance," and "Graduates," as reported by each school for the session of 1894–95:

	Matriculates.	Students in Attendance.	Graduates.
ALABAMA:			
Birmingham Dental College	24	23	1
CALIFORNIA:			
University of California, College of Dentistry	161	161	38
COLORADO:			
University of Denver, Dental Department	24	24	2
DISTRICT OF COLUMBIA:			
Dental Department of National Homœopathic Medical College	11	11	2
Dental Department, Columbian University	64	60	15
Dental Department, Howard University	11	11	0
Dental Department, National University	44	44	9
GEORGIA:			
Atlanta Dental College	158	156	23
Southern Medical College, Dental Department	45	42	0
ILLINOIS:			
American College of Dental Surgery	331	314	68
Chicago College of Dental Surgery	416	387	107
Columbian Dental College	48	48	10
Northwestern College of Dental Surgery	25	25	5
Northwestern University Dental School	119	119	29
INDIANA:			
Indiana Dental College	126	126	27
IOWA:			
Dental Department, State University of Iowa	150	144	25
KENTUCKY:			
Louisville College of Dentistry	129	116	26
MARYLAND:			
Baltimore College of Dental Surgery	164	160	45
Dental Department, Baltimore Medical College	†0	0	0
Dental Department, University of Maryland	184	180	45
MASSACHUSETTS:			
Boston Dental College	172	172	42
Dental Department, Harvard University	80	80	17
MICHIGAN:			
Detroit College of Medicine, Department of Dental Surgery	68	68	18
University of Michigan, College of Dental Surgery	185	185	47
MINNESOTA:			
University of Minnesota, College of Dentistry	70	64	12

	Matriculates.	Students in Attendance.	Graduates.
Missouri:			
Dental Department, Marion-Sims College of Medicine	28	20	0
Kansas City Dental College	153	147	39
Missouri Dental College	85	85	24
Western Dental College	157	151	29
Nebraska:			
Dental Department, University of Omaha	*0	0	0
New York:			
New York College of Dentistry	364	364	82
New York Dental School	12	12	0
Dental Department, University of Buffalo	160	129	30
Ohio:			
Cincinnati College of Dental Surgery	26	26	5
Cleveland University of Medicine and Surgery, Dental Department	30	29	5
Ohio College of Dental Surgery	189	179	50
Ohio Medical University, Department of Dentistry	54	50	8
Western Reserve University, College of Dentistry	53	53	17
Pennsylvania:			
Pennsylvania College of Dental Surgery	313	294	83
Philadelphia Dental College	367	360	115
University of Pennsylvania, Dental Department	278	260	70
Tennessee:			
Central Tennessee College, Meharry Dental Department	12	12	2
Tennessee Medical College, Dental Department	13	13	2
University of Tennessee, Dental Department	58	51	15
Vanderbilt University, Department of Dentistry	137	134	38
Virginia:			
University College of Medicine, Department of Dentistry	31	28	3
Washington:			
Tacoma College of Dental Surgery	16	13	0
Wisconsin:			
Milwaukee Medical College and School of Dentistry	37	37	3

* First session, 1895-96.

According to these statistics, there were matriculated as students of dentistry during the past year 5382 persons, of whom 5167 were in attendance, and upon 1233 of whom the dental degree was conferred during the present year.

In the report of the Section made four years ago, the statement was put forth that at that time the largest proportion of graduates, namely, three-fourths, were passed by twelve of the then existing thirty-three colleges. Three years ago ten of the colleges graduated 851 students, while the remaining twenty-eight colleges graduated 632. This year, out of 1233 from all colleges, 525 graduated from six of them, while from all other colleges the number graduating is 797. Thus, six schools averaged 87 graduates each, while thirty-eight schools averaged 21 graduates each.

The following table indicates the increase in the number of graduates since 1886:

1886 . . .	503	1891 . . .	1241
1887 . . .	597	1892 . . .	1483
1888 . . .	746	1893 . . .	379
1889 . . .	796	1894 . . .	905
1890 . . .	963	1895 . . .	1233
		Total	8846

The decrease in 1893 and 1894 was due to the operation of the three-year course.

II. Dental Literature.

It has been customary on the part of this Section to report a list of dental books published during the preceding year. The continuance of this practice is deemed inadvisable, as the necessary information is supplied in an admirable manner by the publishers of *The Dental Cosmos*, in their monthly bibliography, which contains from month to month a complete list of books published, and a handy reference list of all important papers read before dental societies or published in other than dental journals.

It is, however, considered fitting to refer to the most important work which has appeared during the year, and to the accomplishment of which this Association contributed handsomely. I refer to the "Transactions of the World's Columbian Dental Congress." The two volumes comprising the report, which appeared last Decem-

ber, are without question the most important and valuable additions made to dental literature in its history.

Many of the papers were original communications prepared by men of scientific ability especially for the Congress, while the large majority of the contributions are exceedingly valuable from a practical or statistical standpoint. Certainly no library is complete without a copy of the work.

There has been a movement for some time to introduce the term "stomatologist" in place of the word "dentist," and during the past year one periodical dental journal has adopted the term, having changed its name from the *Pacific Coast Dentist* to the *Stomatological Gazette.*

So far as known to the Section, none of the dental journals in existence a year ago have suspended publication; but one addition has been made, in the appearance, last January, of the *Dental Digest*, a monthly periodical, which is expected to fill a place not hitherto occupied.

The plan of the *Digest*, if it can be carried into execution, is an admirable one. According to the statement of the publisher, this publication will ultimately present each month a complete résumé of all that has appeared in the dental journals of the world, sifted of the chaff, condensed, and placed before us in a form in which it can be readily assimilated.

If a publication of this kind can accomplish the objects it has set before it, the enterprise is highly commendable.

III. Dental Nomenclature.

At the last meeting, on motion of Dr. Guilford, the following resolution was adopted:

Resolved, That a Standing Committee of nine be appointed, to be known as the Committee on Terminology, whose duty it shall be to prepare and submit a carefully prepared report at each annual meeting of this Association.

The report of this Committee will be presented by its Chairman, Dr. Guilford.

The report on this part of the Section will be read by Professor S. H. Guilford, of Philadelphia, and this will be supplemented by a statement by Dr. G. Molyneaux, of Cincinnati, and by a paper entitled "A Basis for Dental Nomenclature," by Dr. A. H. Thompson, of Topeka, Kansas.

In addition, the following papers are reported by the Section :

1. Ought we to Limit the Formation of Dental Schools? By Dr. C. W. Stainton, of Buffalo, N. Y.

2. Should not the Increase of Dental Schools be Checked? By Dr. Louis Jack, of Philadelphia.

3. Whither are we Drifting? By Dr. W. C. Barrett, of Buffalo, N. Y.

4. An Opportunity for a Great National Dental Museum and Library. By Dr. Williams Donnally, of Washington, D. C.

SECTION II.—Continued.

Ought the Formation of Dental Schools to be Limited?

PAPER BY C. W. STAINTON, OF THE SECTION.

ANY one who has thoughtfully listened to or read the annual reports of the Secretary of this Section (Dental Education) for some years past, must have observed that regret has been expressed that dental educational institutions were being multiplied so rapidly. Conversation with our most experienced educators shows almost universal concurrence in this view. Are we overdoing the formation of dental schools and the production of dentists?

The matter is worthy of our serious consideration and study, in order that proper checks and remedies may be used in time to correct this evil,—if it be an evil,—before it becomes too late. Your attention is invited to a study of this problem.

In casting about for some starting point, some foundation which all will agree upon as fixed and sure, two premises will be acknowledged by all as conceded.

First.—That in all civilized countries every individual in the country is a part of the medical constituency. In this the volition of the individual does not govern, but the public welfare will compel medical treatment when the public health is in any way threatened. Public and private hospitals, sanitary rules and visitations, free compulsory vaccination, and other measures enforced without regard to individual wishes, affirm this first premise. Every individual, no matter what the color, age, sex, or condition, comes sooner or later under the care of a physician and constitutes a part of the medical constituency.

Our second premise is, that in medicine, which is as old as the

human race, the law of supply and demand has long been practically established. There may be more medical men seeking practice than can find it; this profession, like the law and the ministry, being generally so overcrowded that "the survival of the fittest" is being constantly illustrated; but the number of medical men in any community or country is a fair measurement of the number needed in that community or country.

These two points I feel pretty sure no one will controvert.

Having these as a basis for our argument, let us see what can be reasoned from them.

By a study of census reports, but chiefly through the kindness of George S. Donnell, chief of the Census Bureau at Washington, who has very kindly furnished information I could obtain nowhere else, I am able to give statistics that will help our study.

There was no separate enumeration of medical men prior to the census of 1850, but as this census reaches back to the census of 1840, it covers practically the period of dental education in this country.

Table I. Showing uniform growth of medical demand and supply.

CENSUS.	POPULATION.	NO. OF PHYSICIANS.	AV. POP. TO PHYSICIAN.
1850	23,191,876	40,765	570
1860	31,433,322	55,159	570
1870	38,558,371	62,448	617
1880	50,155,783	85,671	586
1890	62,622,250	104,803	597
1895	70,500,000*	120,000	587

Our growth of population from 1880 to 1890 was about twenty-five per cent. The growth in the years since 1890 probably has been greater than at any time in our history, and it seems safe to place our population to-day at 70,500,000.

There are two ways of calculating the medical growth since 1890. You will see that the average population to each physician has been about uniform for fifty years; the only exception was the census of 1870. This exception is readily understood when we remember that perhaps the majority of the Southern medical schools were suspended during the war.

* Population of 1895 I have estimated, and have calculated the average population to each physician upon that estimate.

If we calculate the average population to each physician from 1840 to 1890, we see it is 588. This average would give us in 1895, on this our estimated population, 120,000 physicians.

There probably is no surer way of estimating the number of physicians; the average population to each physician being so uniform. A percentage estimated on the growth from 1870 to 1890, gives about the same results. Medical growth from 1870 to 1880 was thirty-seven per cent.

This possible over-production following the civil war made itself felt slightly in a reaction in the last decade, when the growth was twenty-two per cent. only. If we take the mean percentage of these decades and compute our present medical force, it will give us about 120,000, as by the other method.

Several things might be said in confirmation of the estimates given.

Polk's Register, which was published in 1893, and compiled probably in 1891 and 1892, gives a list of over 105,000 physicians with their post-office address and the name of the college from which they graduated.

Wonderful must have been the painstaking care given to the preparation of such a list; but there will be no pretence that every person has been included in such a list. With a list prepared in 1891 or 1892, published in 1893, of 105,000 physicians, it is easy to believe that now in 1895, 120,000 is not too high a number. Then if we look at Table III, we shall see that a proportionate ratio of physicians throughout the whole population would give us over 125,000. But in our cities there are many legally qualified but not in actual practice, Washington alone containing between one and two hundred.

What has been the educational history along medical lines?

The century must have dawned in the United States with about five medical schools in existence. There have been formed since 1800 nearly three hundred new medical schools. Of these fully fifty per cent. have died from inanition or been absorbed by stronger institutions. A very significant hint for us to heed.

It is difficult to give accurately the number of medical schools, good, bad, or indifferent, in the country. The American College Register, which is usually good authority, gives the number in 1893 as 129. The same authority gives it in 1895 as 125. It gives the dental schools in 1895 as 27. If its medical and dental data are alike

reliable, it falls much too low. "Polk's Medical Register" gives a higher number. By going several times over "Polk's Register," where a brief history of every school is given, when chartered, what changes have occurred, what the number of instructors, and how it ended, if it has ended, I thought a pretty accurate number would be 140 for all sorts and kinds.

When I had, as I supposed, completed investigation on this point, I received through the kindness of Mr. Lovick Pierce, the Acting Commissioner of Education at Washington, material assistance. From data kindly furnished by him I am able to give the following table, including all regular, eclectic, and homeopathic medical schools. No report on medical schools was made prior to the census of 1860:

1860	46
1870	72
1880	90
1890	116
1895	156

Most of the above data were obtained from the yearly reports of the Commissioner of Education, which are much more reliable than census reports. These figures would give us a present average of one medical school to every 769 physicians.

Our study so far has proven the soundness of our premises: That the whole people need and control medical supply and demand, and that the supply has been strictly uniform through more than half a century.

Now let us turn our attention to some figures in regard to our own specialty.

Table II, showing comparative growth along medical and dental lines.

CENSUS.	POPULATION.	NO. OF PHYSICIANS.	AV. POP. TO PHYSICIAN.	NO. OF DENTISTS.	AV. POP. TO DENTIST.
1850	23,191,876	40,765	570	2,923	7,934
1860	31,433,322	55,159	570	5,606	5,607
1870	38,558,371	62,448	617	7,839	4,918
1880	50,155,783	85,671	586	12,314	4,154
1890	62,622,250	104,803	597	17,498	3,579
1895	70,500,000	120,000	586	25,000	3,134

The number of dentists given in the above table for 1895 may *seem* too large. It probably *is* too small. Let us look over a partial list of places, populations, and ratios.

I have taken a good deal of pains to prepare a table of fifty cities in the United States, including of course all the principal ones, and giving the population, number of physicians and dentists, and the average number of inhabitants to every physician and dentist. This table has been obtained in several ways; largely by correspondence with dentists in these cities. That this correspondence has been persistent, many of you can testify.

I am indebted in this matter to many personal friends, but I am also indebted to many whose faces and names are unfamiliar; for I have felt free to address any name found in the list of members of this Association. To one and all, whether known or unknown, I publicly express my gratitude for the ready responses given me.

I have been fortunate enough to find directories of many of the cities on the list, thus confirming, or sometimes correcting, the figures reported. Sometimes the directories were not of the current year; in this case the figures are generally below what they should be, but the proportion does not vary materially. Of course it is not exact, and I hope no one will feel in any measure offended if their locality appears in a different light than it should.

The table has about the same relation to exactness as a charcoal sketch would have to a photograph. Whatever errors appear are all on the safe side, and do not invalidate the table. When the average population to each dentist is unusually large, it generally indicates that the number of dentists given is below the true number.

Table III, on the following page, shows the population of fifty cities, the number of physicians and dentists, and the average population to each.

	CITY.	Population.	Phys.	Aver. Pop. to Phys.	Dent's.	Av.Pop. to Dent's.
1	New York, N. Y.	2,000,000	3500	571	1200	1666
2	Chicago, Ill.	1,700,000	2722	624	704	2414
3	Philadelphia, Pa.	1,200,000	2357	509	526	2280
4	Brooklyn, N. Y.	1,000,000	1561	626	528	1852
5	St. Louis, Mo.	600,000	1190	504	160	3750
6	Baltimore, Md.	600,000	915	559	185	2767
7	Boston, Mass.	500,000	875	569	325	1538
8	Cincinnati, O.	3500,00	695	432	150	2000
9	Cleveland, O.	350,000	601	576	114	3070
10	Pittsburg and Allegheny, Pa.	350,000	586	597	140	2500
11	Buffalo, N. Y.	350,000	544	643	140	2500
12	San Francisco, Cal.	350,000	827	420	241	1452
13	New Orleans, La.	300,000	307	977	88	3409
14	Milwaukee, Wis.	270,000	200	1350	90	3000
15	Washington, D. C.	270,000	600	450	226	1194
16	Detroit, Mich.	260,000	400	650	125	2080
17	Minneapolis, Wis.	225,000	340	661	80	2812
18	Newark, N. J.	215,000	242	888	86	2500
19	St. Paul, Minn.	190,000	174	1092	70	2714
20	Jersey City, N. J.	180,000	170	1058	40	4500
21	Louisville, Ky.	180,000	360	500	53	3396
22	Kansas City, Mo.	160,000	450	355	85	1882
23	Rochester, N. Y.	150,000	325	461	70	2142
24	Indianapolis, Ind.	150,000	385	389	70	2142
25	Omaha, Neb.	140,000	190	736	25	5600
26	Troy and Suburbs, N. Y.	140,000	166	843	30	4666
27	Worcester, Mass.	130,000	175	742	53	2452
28	Providence, R. I.	130,000	314	417	75	1733
29	Toledo, O.	120,000	204	588	35	3428
30	Denver, Col.	120,000	450	266	85	1411
31	Columbus, O.	120,000	268	458	40	3055
32	Syracuse, N. Y.	116 000	200	580	50	2320
33	Atlanta, Ga.	100,000	250	400	38	2631
34	New Haven, Conn.	100,000	170	588	43	2325
35	Albany, N. Y.	100,000	225	444	30	3333
36	Grand Rapids, Mich.	85,000	188	452	46	1804
37	Richmond, Va.	85,000	220	386	60	1416
38	Nashville, Tenn.	85,000	200	425	38	2236
39	Paterson, N. J.	80,000	85	941	20	4000
40	Wilmington, Del.	70,000	100	700	20	3500
41	Seattle, Wash.	60,000	117	512	33	1818
42	Hartford, Conn.	60,000	120	500	40	1500
43	Camden, N. J.	60,000	116	515	20	3000
44	Springfield, Mass.	52,000	128	406	32	1625
45	Chattanooga, Tenn.	50,000	100	500	20	2500
46	Sioux City, Wis.	50,000	60	833	15	3333
47	Tacoma, Wash.	45,000	80	562	25	1800
48	Portland, Me.	38,000	90	422	26	1461
49	Akron, O.	30,000	57	526	20	1500
50	Salem, Or.	15,000	40	375	12	1250
	Total	14,081,000	24,639	571	6427	2190

What does this table show?

First.—That our estimate of the number of dentists in our cities is too low. I have not found any list in a city directory which was not below an accurate compilation. Buffalo's list in the directory of 1894 includes 90 dentists, where there should have been 125; this year it is 112, and it should be 140; New York reports about 700, while she really has over 1200.

The new dental law in New York State compelling every practicing dentist to register before August 1, who has not previously done so, makes plain this truth. What is now so easily recognized in New York State is equally true in other States.

The second lesson we get from the table is that the distribution of dentists is pretty universal. Our table does not of course represent rural population. But we see that in the smaller cities in any part of the country, east or west, north or south, the proportion of dentists is greater than in the larger cities. Look at Salem, Oregon; Portland, Maine; Tacoma and Seattle, Washington; Denver, Colorado; and others.

Suppose we take the ten largest cities in our list, their total population is 8,710,000; their total number of dentists is 4047, averaging one dentist to each 2152 inhabitants.

Now take the ten smaller cities on our list, and by the same calculation we find that the average population per dentist is 1892. That the rural communities are well supplied, no one doubts. There is not a small village now in any part of our country without a dentist. A dental friend traveling extensively on both slopes of the Rocky Mountains, recently told me of his surprise at finding dentists more plentiful there than in the East.

Now if we add the population of these fifty cities together, it gives us in round numbers 14,081,000, or twenty per cent. of our entire population. If we add the list of dentists, we find that it makes 6427. Considering this twenty per cent. of our dental force, we learn the third lesson this table teaches, namely, that we have more dentists than any one has estimated: over 32,000.

The S. S. White Company, confessedly the best informed of any similar organization among us, gives me as their estimate 18,000; yet the census of 1890, which no one supposes to be quite up to the true number, gives 17,498. "Polk's Dental Register" of 1893 gives nearly 17,000 names. I have shown that the impliedly correct list of Buffalo was twenty per cent. below what it should have been,

and that of New York was forty-two per cent. lower than the facts warranted. That a somewhat similar condition is generally true cannot be doubted.

Never in our history have we been producing dentists as in the last decade, especially the last half of it,—since the last census. Let us see what we have wrought:

YEAR.	NO. OF SCHOOLS.	GRADUATES.
1886	24	503
1887	28	597
1888	29	746
1889	31	796
1890	33	963
1891	33	1241
1892	39	1483
1893	35	379
1894	47	905
1895	52	1208

The adoption of the three years' course of study explains the falling off from 1892 to 1893.

An attempt has been made to get from a good many, estimates of the percentage of the population in their city who employ dentists. The attempt has not been very successful. Nobody knows positively anything about it, and most have never given it a thought. The result has been that the majority have refused to hazard even a guess. Fifteen returns have been sent me, ranging from fifteen to sixty-five per cent.; the average is twenty-five per cent.; probably too high.

A very earnest effort to get some light from another point has been to formulate some idea of the average number of people making up the clientele of a reputable practitioner. While such a man does not see as many people probably as the "Painless Dentist," or the "Steam Dentist," or the "Modern Dentist," yet when we think of those who are good, but not successful practitioners, the beginners, not as yet in full practice, and the three to five per cent. not in practice at all,—although their names help to swell the list,—it seems that such an average would be of decided interest. The task was most difficult.

The first idea that impresses one when asked to give such information is that it is prying into his business. Such is not the case. Numbers have almost no relation to the pecuniary value of the practice. In my own city, where I could call and explain what was wanted, no difficulty was found in getting such data. But when I

tried by correspondence to get this from comparative strangers, the effort was not so successful.

While collecting these data, my attention was called to the discussion following a paper read by Dr. Brophy before the Illinois State Dental Society in May, 1894, when this matter was subject of debate. The consensus of opinion there expressed was, that a man could care for only about 500 patients each year.

Dr. Kirk, of Philadelphia, writes me that Dr. Thomas, of that city, some years since made a study of this question. From ten of the principal dentists in Philadelphia he received estimates which would show that the average number of patients each year would be about 400. I am of the opinion that the estimate given in Dr. Thomas's investigation is too low; the dentists furnishing him data having a choice clientele of patients, and seeing fewer people than the ordinary dentist: for this rule undoubtedly is sure, that as the practice becomes choice, the number almost necessarily diminishes.

I have received estimates from thirty different dentists in various sections of the country, all of good reputation in their locality, many of them widely known as practitioners. The estimates vary from a little over 300 to 1000. The variation is largely due to the manner of estimating. My idea has been to have the correspondent take more than one year as the period, for a patient may be properly considered a patient who only once in two or three years visits his or her dentist. What was wanted was the number of *different* people who had been under their care, say in the last three years. Some of the estimates are for one year only. A longer term would generally increase the number; not necessarily in the choicest practice. As a rule, the lower number indicates the choicest practice.

My estimate of the average would be about 600. I am pretty sure that in a choice practice such an average seems much too high, but we must remember that these are only a minority, by no means a majority among us.

Having now in these United States about 25,000 dentists, who are capable of caring for about 600 people each, we ought to have a dental constituency of about 15,000,000. It is very doubtful whether we have any such number. Do not let us forget that during the period under examination we have received 15,000,000 immigrants, who, when they arrived, became at once part of the medical constituency, but were in no sense, except by slow education, a part of our dental constituency.

What mean all these statistics? What can we deduce from what has been shown?

That the dental ranks are as full to-day in the United States, in proportion to the demand, as the medical ranks.

No one will deny that quite a percentage of medical graduates abandon practice in a short time, because their calling is so over-crowded. It will be claimed that multitudes of people among us need educating up to the proper care and salvation of their teeth. This will be conceded, but that the multiplication of dentists will bring this result does not at all follow.

The over-crowding of our ranks in any locality is prolific in cheap and nasty practitioners, and the lowering of the standard and character of our specialty. The over-production of dentists is not a good thing either for us or for the public.

How can we restrain this over-production? Can we forbid to any young man the study and practice of dentistry? Certainly not.

The raising of the standard of admission to our dental colleges, and the lengthening of the course of study so that it takes as long and costs as much to enter dentistry as medicine, will do much to deter from the hasty entering of dental schools.

But the *multiplication* of dental schools is the chief danger in this direction. We have seen that the ratio of dentists and physicians is as one to five. A dental school can and does educate an equal number of students, as compared with a medical school. There are about 150 medical schools. An equal proportion would give us 30 dental schools. We have now nearly double this number, and still they come. It is the present fad, and we have the craze badly.

In medicine there is a medical school to 770 practitioners; in dentistry there is a school to 400 practitioners.

Will the multiplication of dental schools and the over-production of dentists cure itself? Undoubtedly it will, sooner or later; but that is a very expensive method. The civil war cured some things; but its cost was fearful. We have seen that half the medical schools organized in this country have died out; and the experience of our medical brethren ought to be a lesson to us. Experience in other educational lines ought to benefit us.

From 1845 to 1855 there swept over the western portion of New York State a passion to organize schools of a high grade. Every village of one thousand inhabitants must have an academy, seminary, or collegiate institute. The next decade proved the folly of this

over-production. One of our largest religious denominations had, in this territory, a well-established seminary and a young but flourishing college. Many, if not most, of these schools besought this religious body to accept the charge of them, as feeders for this young college. Such an opportunity was seductive, and many were accepted; but a few years demonstrated that not even the fostering care of denominational influences could make successful this over-production, and to-day not any of these academies, seminaries, or collegiate institutes has a name even to live.

Dental schools are not being formed now from any need felt for them as an educational necessity. The impulses actuating Chapin A. Harris and the Fathers are not producing schools now.

Two impulses now control this matter,—impulses unknown in the beginning:

First, personal ambition to have a position in and be connected with a dental school for the prominence it is supposed to give.

Second, a purely commercial spirit on the part of medical schools to have a dental department.

Dr. Ottofy referred to this with marked emphasis in his report last year. I ought to quote him at considerable length right at this point; but my paper is already so lengthy that I forbear. But I ask you to again read his last year's report. Already over sixty per cent. of our schools are appendages to medical schools. While this is not necessarily the worst thing that might happen, it shows most emphatically one portentous fact: *that medical influences and elements are fostering, more than any and all other influences and elements, the formation of new dental schools.* The utmost assurance will not claim that these elements and influences are actuated by our educational needs. They are almost totally ignorant of them. This fact ought to arouse us from indifference in this matter. Nearly every dental school started in the later years has been started under this outside influence.

Now, is it not pretty plain, in the light of all these indisputable facts, that we ought to manage some things more wisely?

Can we do anything to cure this evil? Certainly we can. We have the moral right. We have the proper organization. The National Association of Dental Faculties ought at once to serve notice, "*That hereafter no dental school would be accepted under any circumstances, unless the consent of the Association had been first asked and received for its formation.*"

This course would not be particularly unique. Every one of our chief religious bodies takes this course in all our principal cities. It was a necessity ; without it a church feud, resulting as was often the case in a division of the church, which meant two churches of the same faith occupying practically the same ground, and of course working injury to one or both, and to their denomination generally.

Now the Methodist, Baptist, or Presbyterian Union is asked, *first*, to approve of any proposed new church enterprise ; for it is well known that unless consent is first obtained, there is little probability of future recognition or fellowship.

Those outside our own family ought at least to ask our consent before they demand to be married to us.

Would it be too great an assumption of power for the National Association of Dental Faculties to do this? Certainly not. Let us have faith as a grain of mustard-seed about some of our own prerogatives and possibilities. The Faculties Association has proven its character and wisdom beyond the largest expectation. If the few who met in New York eleven years ago had seen what their movement was to accomplish, they would have been awed at the prospect.

A body which can modify and improve at every point its own interests, constantly bettering the condition of everything it touches with its scepter of power ; that can chastise its own members, no matter how old and intrenched in position ; yea, better, can reach outside its own circle, and correct and punish the unseemly behavior of older institutions who seem to feel a call to lord it over us,—an organization which has done all this without even the smell of fire being found upon its garments, need not hesitate to undertake any reform that is needed.

The moral force of twenty-five thousand dentists, yea, of all the world, would sustain it in such a movement.

SECTION II.—Continued.

Should not the Increase of Dental Schools be Restricted?

PAPER BY LOUIS JACK, OF THE SECTION.

AT the meeting of the National Association of Dental Examiners of 1893, the rule was formulated that a preliminary condition to the reception of any application for admission upon the list of reputable schools must be its previous admission to the National Association of Dental Faculties.

At the meeting of the Association of Faculties in 1894 the resolution was passed: "That any dental college or colleges making application for membership in the National Association of Faculties shall be required to secure and present to the Executive Committee the approval and indorsement of the Board of Dental Examiners of the State in which such college or colleges may be located, before their application can be considered."

The apparent reason for the adoption of this resolution by the latter body was stated to be, the great difficulty of obtaining satisfactory information and evidence in regard to the status of applicants.

The motive of the Association of Examiners was one of respect for the Association of Faculties, inasmuch as it appeared more rational that the recognition by the Association of Faculties should have the precedence, and as putting that association under less stress by an applicant than where it had been previously accepted by the Association of Examiners.

There was also a feeling upon the part of both bodies that the increase of schools was proceeding at too rapid a pace; and the sentiment was being expressed in each that a greater requirement than additional schools would be an extension of the period of instruction, and an enlargement of the curriculum of colleges already under recognition.

A very important condition appearing in conjunction with these sentiments is, that the newer schools and those under organization are not being installed with the equipment, the facilities for instruction, the fullness of faculties and the laboratory teachers they should have: some of these schools being such in name rather than in fact.

The tendency to rapid increase of dental schools is shown by the statistics since 1891. At that time there were twenty-four on the list of schools recognized by the National Association of Dental Examiners. In 1892 one dropped out of existence and five were admitted, which raised the list to twenty-eight. At this figure it remained until this year. In 1893 there were eight unrecognized schools; in 1894, fifteen. Of these we have this year recognized three, making thirty-one recognized, but the increase has gone on at such a rate that there now are eighteen unrecognized.

It may be of interest to explain the value of the diplomas of this class of schools. While they have legal value in the States where they are granted, they give no *prima facie* right to practice anywhere else without re-examination by State Boards, and in some States their holders would not have the privilege of being examined.

To understand this question correctly, it is necessary to take into consideration that the Boards of Dental Examiners are creatures of law, and that the law invests them in most States with judicial power in certain directions, and under this power they determine questions affecting the standing of the schools; and in their collective capacity as the National Association of Dental Examiners, formulate rules for the guidance of the State Boards.

A manifest tendency of the present period is in the direction of the establishment of dental departments in connection with medical schools. This will appear from the statement of the fact that of the thirty-three schools in the Association of Faculties in January, 1895, but five are of this class, while of the ten listed schools outside of this organization, seven are of this class; and of seven unlisted schools in force or in a state of organization, five are of this kind. There are also others of such in contemplation. I have no disposition to inquire closely into the motive for this association of dental with medical schools. But we have to deal with a new and dangerous situation. It does not augur well for the interests of the dental profession that the generality of the medical schools entering into this enterprise are not leading ones. Well-established and strong medical schools have no disposition toward such extension. They have

not the room nor the facilities to honorably engage to furnish the arrangements for proper instruction in our specialty.

It is palpable that the correct motive underlying all attempts at teaching should be the provision for the fullest and the most varied instruction pertaining to the subject to be taught. In reference to dentistry, this now requires an installation far beyond what the ordinary medical schools can furnish. In addition to the provision for the medical studies, there are needed for the operative department an infirmary of considerable size, with class-rooms for manual training; for the prosthetic department, a general laboratory; special class-rooms for demonstrations; a metallurgical room and special laboratories for ceramics, etc. This makes the scant quarters of the common medical schools far deficient for instruction in dental surgery.

The question may arise against the line of argument in this paper, so far as it has relation to the ordinary medical schools, that as there are in the Association of Faculties thirteen dental departments connected with universities, and that these connections are in direct relation with the fact that these universities furnish instruction in the medical sciences, therefore, what is the difference between a dental department of a medical school and the dental department of a university? The answer to this is that universities which are really such are organized upon a broader basis. Their system of education looks constantly toward an enrichment of the instruction of their pupils, their motives are more generous, they are likely to be governed with less regard for personal and selfish interests, their governing bodies are raised above the jealousies of aspiring men, the sphere of study is in the air, and an ennobling influence surrounds them. As time passes, their foundations widen and become more firmly established in the confidence and affection of the people. They reach the abiding rock of public support. They attain increasing strength with age. They are not in danger of suffering from the shock of antagonism, and can easily correct deficiencies as they may appear. As the evolution of education and of society advances, their life and their influence must widen, and they certainly will enjoy increasing enrichment by the abundance of public support. These advantages are less likely to attend the future of any class of institutions into which may enter personal or private relationship, as when pecuniary considerations are permitted to cloud the liberal impulses requisite to maintain the life of public institutions.

When we take into view the fact that there are over one hundred

and fifty medical schools in the United States, it does not require any stretch of imagination to perceive the danger which lies before us in the direction above indicated; neither is there any question, in view of these considerations, that some restriction is necessitated to be placed on these institutions, unless they make equal provisions for instruction with the best equipped dental schools already in existence.

If the standard for the acceptance of new schools be made as high or higher than has been reached by the most approved among the older ones, the process of leveling upward will then take place, instead of a general lowering of the average of standing.

The dental degrees of America, as is painfully apparent, are being discredited in Europe, for the reason that the preliminary requirements of the student and the curriculum are not sufficiently advanced. The evident incentive here should be to correct this sentiment by conforming to the standards which will do this. In case some check is not put upon the addition of dental schools which are not of high order, the prejudice against the dental institutions of this country must further increase.

It must be considered unfortunate that it is a difficult matter in this country to control the establishment or the conduct of educational institutions. The States have no principle which can be exercised to regulate the quantity of schools. They may increase to injure each other by surpassing the demand; but in the survival of the fittest the public suffer by the degradation of the standards, and consequently from inferior qualification of the product.

In Europe these questions are carefully governed by the State, which provides laws, grants privileges, and makes rules regulating such public affairs. There the State does not hesitate to use its force to protect and foster the interests of what it creates, and by the same effort insures the public good.

Here the crystallization of sentiment into law is more lax, is inharmonious, and uncertain of enforcement; and therefore we have to depend upon the development of opinion to assist and support such bodies as the Association of Faculties and the National Association of Dental Examiners in the formulation of such rules as shall guard the interest of all concerned, and to aid in checking the degradation of our profession.

SECTION II.—Continued.

Whither Are We Drifting?

PAPER BY W. C. BARRETT, OF THE SECTION.

MOST dentists accept as an axiomatic fact the assertion that dentistry is an integral part of medicine when properly practiced; and most physicians promptly admit it. There is, year by year, a constant extension of the several fields or specialties into which medicine is divided, a more complete comprehension of the principles involved, and an expansion of the benefits conferred. This augments the amount of work to be done, and consequently the future demand for dentists will increase at a greater ratio than will the population.

At the close of the Revolutionary war, this country contained a population of only about three and a half millions. It is probable there were not twenty men engaged in the practice of dentistry at that time, and even these were compelled to eke out their living by adding some other avocation. This gave one dentist to about each hundred and seventy-five thousand of population. But the dentistry of that day was exceedingly limited in its scope, and the separate operations covered by it were very few indeed.

In the year 1830 the population of the United States had increased to about twelve and three-quarter millions. The number of dentists has been estimated at seven hundred, which would allow one dentist to about each eighteen thousand of the population. The scope of dentistry had been materially broadened at this time, and instead of carved ivory for artificial substitutes, metallic plates were in use; but the art had not yet invaded any part of medicine.

In 1850 the population was twenty-three millions, and dentists had multiplied greatly. According to United States census reports, there were then two thousand nine hundred and twenty-three, which would give one for about each seven thousand eight hundred of the popula-

tion. Shortly after this came the advent of rubber, and a horde of young men came rushing into dentistry, only a small proportion entering by way of the colleges, which had already commenced their beneficent work.

About the year 1870, when the population had reached thirty-eight and a half millions, educational ideas had permeated dentistry, and dental legislation was repressing the ignorant who were thronging our gates. More colleges had provided better means for education, and as they multiplied, the leaven which they had infused was permeating the whole body, and a diploma was recognized as the first essential for proper practice. The whole scope of dentistry was immensely expanded, and the necessity for medical training was beginning to be recognized. Where there had been room for one dentist, there was now opportunity for a number, because of the greater breadth of the field which they occupied. The United States census reports show that there were then in practice eight thousand seven hundred and thirty-two dentists, which would give one for about each forty-four hundred of the population.

At the present time we have a population of more than sixty millions, with over twenty-three thousand dentists, allowing one for each twenty-six hundred of the population. Yet the amount of work done by each individual dentist is very much greater than when there was but one practitioner for each one hundred and seventy-five thousand of the population. We now have nearly fifty colleges, each of which is doing something toward extending the field of dentistry. Each will, year by year, widen its curriculum, broaden its teaching, and deepen the ever-augmenting stream of dental practice, through the natural emulation that must and should exist. Dentists this year are performing operations and treating pathological conditions unthought of last year. It is but a few steps back in the memory of some of us when any surgical interference, beyond the extraction of teeth, would have been deemed a violent assumption of unwarranted prerogatives on the part of a dentist. To assume the treatment of any oral disease would have subjected him to the censure, not only of the regular medical man, but of the whole community in which he lived. His practice was confined to the filling of holes in the teeth, and to prosthetic work exclusively, and he was rated in the community as a mechanic or artisan one degree in status above the shoemaker.

How is it now? There is a considerable proportion of this body that has entirely abandoned mechanical work. I cite this fact only

as evidence of the broadening of our field, and the tendency toward a division into specialties, as is the case in medicine. Extracting of teeth is now largely relegated to the man who does nothing else. The dentist writes his prescription for, and directs the treatment of, a large and constantly augmenting list of human ailments. His field has grown an hundred fold. His duties have increased beyond the conception of the early practitioner. It is true that dentists have greatly multiplied in number, and we constantly hear the wails of the pessimists who declare that the colleges are turning out graduates at a rate that must soon make their number greater than that of their patients. These prophecies of evil are usually heard from the old-time practitioners, who have not broadened their practice with the advance of modern ideas, or kept pace with the progress of professional events. To them the greater part of the dentistry of to-day has no existence, for their horizon has not been pushed back during the last few decades. With their restricted conception of dental practice, confined as it seems to them to be within the limits of their narrow field, it is no wonder that they cannot see where room shall be found for the constantly augmenting number that come thronging through the gates, and they condemn the colleges in no gentle terms for launching such hordes of practitioners into a stream that, to their conception, now seems absolutely turbid with them. They forget that these same colleges are year by year digging that stream deeper, and making it wider in a much greater ratio than they are peopling it with occupants.

But there is no disputing the fact that the absolute number of dentists is rapidly increasing. The profession is growing in importance at a rate that no educated body of men in any avocation has yet emulated. We can easily foresee the time when there will be fifty thousand dentists in this country. What are we doing toward securing an organization that shall make of them the most effective body of practitioners that the world knows? Each of us has his ambitions. We all desire to see dentistry planting itself upon the very summit of the hill of science. Why should we not seriously consider the problem of the future edifice which is so rapidly being constructed? We are the architects. Why should we not have a properly formulated working plan?

The American Dental Association comes the nearest to being a true National Association of any society that we have among us. It has about two hundred and fifty members. What kind of a representation is this? That is one in every two hundred and eighteen of

the dentists of America. The Southern Dental Association does not pretend to be National in its character, although it covers a large extent of the territory of our common country. Both of these Associations together have not a corporal's guard, as compared with the great army of dentists. What shall be done to increase our representation?—for we all agree that societies are more potent for the elevation of our beloved profession than any other known means. Let us look into the matter.

The mere desire for the listening to and the debating of scientific papers will never be sufficient to call together any great proportion of our numbers. There must be some other attraction. We have tried clinics, but they are too elementary, and partake too much of the kindergarten. We have invited the display of dental materials and implements by the manufacturers, but this has been found debasing in its tendency, as leading toward trade, and as fostering among us the mercantile instead of the professional spirit. We have added sight-seeing and pleasure-jaunting. This is in one sense an advance, because it conduces to that which should be made more of a distinctive feature,—the social side of our meetings. A considerable proportion of those who are at Asbury Park to-day come that they may renew old acquaintanceship, enjoy old friendships, meet again the men with whom they have long associated, and whose faces and companionship are very dear. It is the hundred or so of these old members, who love each other as brothers, despite, and perhaps in some instances because of, the many battles which they have fought with each other, that give the main interest to our annual gatherings. When we meet at some extreme city of our great country, as at Minneapolis, and draw in a throng of new members, but a few of these continue with us, because the next year they would be compelled to travel a long distance only to find themselves among strangers. The few who have faithfully attended each year, and who therefore are old companions, must form the nucleus, and upon them the meeting must mainly rely for interest. There are scarce enough of additions to the ranks of these loyal hearts to atone for the havoc that death annually makes. And these few, I repeat, attend mainly that they may meet old friends and enjoy a few social hours, too often spent in the contentions and wranglings which are so congenial to the natures of some of us.

It is then evident that we must do something to promote the communistic side of our meetings. How can we best do this, and so

perhaps secure a better representation of the profession? It seems to me it must be by division, rather than wider aggregation. There are few men who can get well acquainted with each other when our societies cover such a great extent of territory. There is little in common between the representative from New England and the one from the great southwest. There are climatic barriers; there are local differences; there are sectional jealousies; there are almost racial dissimilitudes. A few will rise above all these considerations, and in time adapt themselves to the variations of character and interest. But they must necessarily form but a small part of the whole. The principal body of dentists will remain strangers to each other, and will only attend the meetings when they are in their own immediate neighborhood, and then mainly from curiosity.

Our country comprises three million six hundred thousand square miles. The resident of the Pacific coast must travel as far to attend the average American Dental Association meeting, as it would be for us of the East to go to Europe. If we draw a line midway between the eastern and the western extremities of the United States, it will fall in the Pacific ocean, three hundred miles west of San Francisco. That city is nearer the center of our country than any other which we have. This, our National Association, has never yet made itself national in fact by going west, even to the geographical center. This society really represents but a small portion of America, and it is very far from being national in the territory that sends its delegates, whatever it may be in intelligence. Nor is it practicable to make it really representative. The country is too large. It is impossible for the members from all sections to meet at one central point, and if it were, there is not a sufficiently intimate acquaintance among them to tempt them to travel so far. We are necessarily too great strangers. When brought together we divide into cliques, as prompted by our interests and our preferences. We are not and cannot be molded into one homogeneous whole socially, and hence there is little to allure the average dentist to undertake the long journeys necessary to attend at a central point. He prefers to meet with those whom he knows better.

The efficient organization of the dental profession of the future demands that we pursue a course different from that of the past. We should have a number of great societies, meeting annually, with perhaps delegates from each of these to form one central Association, which may meet either at a fixed point or itinerate among the differ-

ent sections. It would be an invidious task to propose a specific form, and I do not intend to advocate such a thing, but it would seem that we naturally tend toward four aggregations; one for the east, one for the west and northwest, one for the south and southwest, and one for the trans-montane portions of our common country. I believe that in time dentistry will be thus organized, and that we should keep this tendency constantly in view.

But the American Dental Association has not yet served its full purpose, and I am not by any means proposing to abandon it. The burning question is, What can we do to make it more effective? Some years ago a committee was appointed to consider this very matter. That committee labored long and faithfully. They considered and patiently digested many schemes, and finally, after two years of careful study, unanimously arrived at a conclusion, and presented certain amendments to the constitution which they believed would result in great good. For three years the report of that committee has been before this body without receiving any special attention whatever. The politicians of the society have simply shelved it, not allowing it even to be presented. I have never heard urged against it any special objections whatever. We all admit that the representation in this society is not what it should be, and yet we do nothing to improve the status. I hope that the matter will be thoroughly considered this year, and that we shall at least take some steps to improve the social condition: that we shall strive to get better acquainted; that we shall bring here less of personal interests to be served, and endeavor to promote a better fraternal feeling; that we shall endeavor to confine the mercantile spirit to the manufacturers and dealers in dental goods, and discourage it among ourselves, by declining to give attention, at this our great convocation, to the hundred catch-penny gimcracks that are annually pressed upon our attention, and that especially they be kept out of this Association, the time of which should be devoted to affairs of a broad professional nature; that we shall earnestly and honestly strive, each with the other, to approach the consideration of these questions in a broad catholic spirit, with due charity for the weaknesses of others, and in the remembrance that because our brother does not view matters from our own particular standpoint, he is not therefore necessarily an insincere and dishonest rogue.

DISCUSSION.

DR. FILLEBROWN : Mr. President, I cannot presume to add to the strength of a paper so excellent as the one presented by our friend, Dr. Stainton ; but as that crystallizes and represents here a sentiment in regard to the possible results that the National Association of Dental Faculties might bring about, I wish to say just a word. The impression is generally prevalent, I think, that it is within the power of the National Association of Dental Faculties to prohibit and prevent the formation of any more dental schools. The argument was drawn from a supposed resemblance to religious organizations. Wherever the building of a church can be prohibited by a religious association, it must be in a community where the church is dependent upon the missionary society which they call upon to pay the bills ; the refusal of the society to do this practically prohibits the building of the church. But not all churches are built that way. In one of the suburbs of Boston there are, within a radius of half a mile, now being built, or projected, four new expensive churches. The projectors are abundantly able to pay for them, and their right or privilege to build does not depend upon the consent of any society or person. Now the National Association of Dental Faculties does not have to pay the bills of new schools, and so we cannot prohibit their formation. If we attempt it, our prohibition will not be respected. The schools which came before the Association at this session for admission said to us, "We have our equipment now. We have money enough behind us to make the schools all we wish, and we intend to make them first-class." What power have we over such? Not any. I wish you all to look at the subject in the light of the actual facts, and then you will give us a little more sympathy, and see that we are powerless to prevent the establishment of new schools.

In regard to the number of medical practitioners, I think the large army of irregular practitioners was not considered in this estimate, consequently there are many more physicians in proportion to the number of patients than this table represents. No doubt there are also many more dentists. While there *is* a great increase of practitioners, I think the increase in population will prove very much larger than the proportional increase of graduates. I mean that the graduates from year to year are not enough to supply the normal increase, and consequently we are not overstocked.

The propriety of dental examiners examining graduates has been

questioned here, and that a graduate in one State cannot go into another State and practice without being re-examined. Gentlemen, that to my mind is no objection. The State of Massachusetts has a law for lawyers and for dentists, and I think the same applies to medicine, that every graduate must submit to an examination before an examining board before he can have a license to practice. Every man who graduates from the law school of Harvard University has to go before the Board of Examiners appointed by the court and pass an examination before he can practice. Every dentist who graduates from the dental school of Harvard University has to go before the Board of Examiners and be examined before receiving his license. We in the University knew of this provision in the law when it was passed, and no objection whatever was raised. The attention of the profession was called to it, and they raised no objection whatever. I say it is a good whip to hold over the schools. I say it is excellent in every way, and I hope it may not be rescinded.

DR. MCMANUS: Mr. President, I have been specially interested in the papers this evening, for the reason that I have been engaged in a legislative fight this season. In our State of Connecticut, much to the surprise of the majority of the dentists of the State, at the meeting of the last Legislature a bill passed the lower House to incorporate the Connecticut College of Dentistry. The Board of Dental Commissioners of Connecticut knew nothing about it, and I think I am safe in saying there were not twenty dentists out of the three hundred and seventy-five in the State who knew such a thing was to be asked for, or thought that such a college was needed. After seeing the announcement in the papers that a bill to incorporate this college had passed the House, the Recorder of the Dental Commission and myself went over to the State House to see the Governor and have a talk with him regarding the passage of this bill.

Our President, this morning, gave a rather rose-colored idea of what future legislators would do with reference to educational institutions. Our experience would not bear out his statement. We had our conversation with the Governor. We told him our opinion that the college was not needed, that such an institution ought not to be incorporated. He sent for the Chairman of the Committee of the House, who came into the Governor's room, and very hurriedly he commenced to ask questions, wanting to know what objection we had to the school, etc., and finally he remarked that one of the

incorporators was a special friend of his. We knew then pretty nearly where we stood in the matter of opposition; but the Governor suggested to the Chairman of the House Committee that the bill should be returned to the Committee, and that the dentists of the State should have a hearing. The gentleman said he would recall the bill if we would see the Chairman of the Committee of the Senate. We saw the Senator, and he said he would willingly have it recalled. We waited for about ten days for a hearing, and all of a sudden we found the bill came up in the Senate and very nearly passed that body. If we had not had a friend in the Senate who asked to have it laid on the table for a day or two, it would have passed at that time. In the mean time our State Society had its annual meeting, and at that meeting the Society appointed a committee to appear before the Legislature and ask for a hearing, which was granted. We waited ten days, and then we got notice that we would have a hearing at two o'clock. A committee of three from the Society, who invited three of the ex-Presidents and some other gentlemen,—old members of the Society,—were there at two o'clock, and we were kept waiting for two hours and a quarter; and appearances seemed to indicate that they were going to freeze and tire us out, but they finally gave us a hearing. I was asked, on the part of the Committee, to present a protest, which protest it took exactly eight minutes to read; but as I commenced reading the protest, the Chairman of the Committee took up the evening paper and commenced reading it, paying no attention to the protest at all. After I had read about a half-minute I stopped a moment or two, and he dropped his paper, and I asked him if I should go on. At that moment the Senator came in and took charge of the proceedings, and from that on we had rather a respectful hearing. That same Committee reported again in favor of the establishment of this college, and the lower House passed the bill again. We then had to go to the Senate. Fortunately the Adjutant-General on the staff of the Governor of our State is Dr. Graham, and he had the ear of the Senators. They would listen to him when they would not listen to others, and through his influence and the influence of a few others we managed to prevent the incorporation of the school. Our whole aim in attempting to prevent that incorporation was not because of any feeling of antagonism to any of the five incorporators, but because we knew there was no necessity for any institution of that kind in our State. We knew that if it was incorporated it could not

succeed. We also knew that our State had a record for clean, honest, earnest educational legislation, and we did not want an institution incorporated that in the nature of things could not be a success. For that one reason, and that alone, we opposed it, and I am very glad to hear the remarks that have been made to-night, and especially the report of Dr. Ottofy. It simply sustains our action in this matter.

DR. STOCKTON: I have been very much interested indeed in what has been read here to-night. It shows a great deal of interest, a great deal of research, and a great deal of time spent. Professor Buckingham, whom we all loved and honored, said once to this Association, "We do the best that it is possible to do with the material that has been sent us." Now, that may have been true in his day. I doubt very much if it is true to-day; and the only point that I wish to raise to-night in this discussion is this: Cannot the Board of Faculties, cannot the colleges of this country, turn out gentlemen? Can there not be some restriction thrown around graduates that they will not go out and put up a sign like this, for instance: "Hanks yanks teeth"? A graduate of a dental college puts out a sign like that. I am only giving that as an instance. You know that such instances occur all over this land, where men go and advertise "the best set of teeth that can be furnished, for five dollars, and warranted to last." I claim that the colleges can very largely remedy this evil by at once saying, when their knowledge is brought to the fact, to any graduate of theirs who does this sort of thing, no matter where or who he is, that at once his diploma shall be recalled. He may own it, but they can put a brand upon him that will make it very unpleasant for any man to assume that position. To-day he gets a diploma. He hangs it upon the wall and claims that he is just as good a dentist as you or I; that this college or that college, honorable in its name, high in its tone, has sent him out qualified to practice dentistry; that he can do as he pleases; that the honor of that dental school stands behind him; and he advertises in the way I have instanced. If dental colleges would put their ban upon all such behavior, such practices would very soon cease.

DR. RHEIN: Mr. President, while listening to the paper of Dr. Stainton, of Buffalo, and some of the discussion that has taken place, it appeared to me as though I was at a meeting of a plumbers' association, or a central labor association, or something of that sort. It is not saying too much to condemn the spirit of illiberality pervad-

ing the remarks that have been made, urging the attempt to restrict the entrance of men into our calling. No one can fail to recognize the great amount of poor timber that there is among men who call themselves dentists; but are we going to elevate the character of the profession by erecting a Chinese wall about us and endeavoring to keep out practitioners? This has been attempted in a great many States in this country, by means of the enactment of laws, some of which will not bear judicial inquiry if put to test.

Issue must be taken with the statement that the figures presented here meet the question of supply and demand, or that they will do so for many years to come. The natural tendency of this country is to an increase in the general education of the people, and as that process proceeds, so will the people learn the value of taking care of their mouths and dental organs; and without taking into consideration any normal increase in the population of the country, the present number of dental schools will soon be found totally inadequate to supply the number of properly qualified dentists that will be demanded in the United States of America. It is one of the worst blots that can be put upon the record of this Association, that it should appear before the public as taking such a position as seems to be hinted at in some of these papers.

Now, the question, as it presents itself to me, is not that there are too many good dentists, but that there are too many poor dentists. Can we make better dentists out of men who have become wedded to their disreputable methods of practice? The only thing that will improve the status of dentistry will be the establishment of better dental institutions than we have to-day; better, I say, because a large number of those now existing are not adequate in their manner of instruction. It is not our place to find fault with those who wish to start an institution and connect it with some university or some prominent educational institution, and who wish to put it upon a plane higher than that occupied by institutions already existing. On the contrary, that spirit should be applauded and fostered, for through it only can better men be turned out, and it is the only stimulus that will make the other institutions come up to a higher standard of dental requirement.

DR. FLAGG: The subject, it seems to me, is one of the very greatest moment to our profession. It seems to me as though the entire time of this organization could probably not be better spent than by having a full and free ventilation in regard to this matter.

As I view it, a house divided against itself cannot stand. Dentistry is with me first, greatest, grandest, best all the time. Dr. Jack says there is a great danger threatening our profession. Our profession! What is our profession? Are we a profession? Are we united in regarding ourselves as a profession? A very few moments after that he spoke about the ability on the part of certain universities, because of the great facilities of their corporators, etc., to educate students in our specialty. It seems to me that there is the rock upon which we split. We are all striving, and truly as I believe, for the good of our profession. We want to have a more generally educated profession. We want to recognize, one and all, that it is gentlemen that are turned out as practitioners of our profession, and I for one would recognize, as well as does my good friend Dr. Jack, that a university would be the very thing par excellence, in all probability, to educate men for the profession of dentistry; but not through the agency of their medical physiologists, their medical anatomists, and their medical chemists. They tack on these various medical gentlemen to little adjunctive chairs,—one with a long room for clinical purposes, another for prosthetic purposes, another for other purposes,—tacking them on, as we recognize to be very largely the case, from a commercial standpoint. I do not like to speak very much on that, because if there ever was a man who went with a beautiful idea into dental education, it was myself. I wanted to do what I could in that line. I wanted to do what was given to me to do in the way of development. I wanted pay for it. I had no idea, and never had an idea during all my life, of doing anything for nothing. If I lecture in a dental college, if it does not turn out a reasonable class in the way of graduates and matriculants, I do not think you will find me there very long. Now, there are scores just like myself, only better. There are scores of men who are working, as I recognize, on the same line. They want big classes. They want good pay. They want facilities. They want to educate their graduates to be creditable all through the United States. They want them to be able, as has been suggested, to go before any board. I rely upon the boards, and bless the movement in favor of State Boards. I took that ground in our faculty, and when the position was taken by some gentlemen that it was rather discreditable that our diplomas should be looked at sidewise by State Boards, I said—"It is the presence of State Boards that will prevent them from being looked at sidewise." I have relied upon the State Boards, and I think they

are a foundation for the progress of dentistry. For a man to be examined in every State in which he practices seems to me to be just now the very thing to do. I trust that in the course of time education will be such that it will be unnecessary. As long as a large portion—I will go so far as to say a majority—still hang on to the idea that this profession of dentistry is going to be elevated by wiggle-waggling as the tail of medicine, I do not believe we will ever make any progress. Just as soon as we are all for dentistry first, last, and all the time, just as soon as we recognize that the extent of dentistry is so great that no one of us, not the very best man among us, is a thoroughly well-educated, all-around dentist, then we shall progress.

DR. BOGUE: I agree in the main with what Dr. Flagg has just said, and I ask myself the question, Why are these papers read before this Association? It seems to me that they are read because the Association possesses moral weight. I was deeply impressed by Dr. Stainton's figures, as I have been by another fact which was brought to mind by Dr. Jack's paper, namely, that I know quite a number of young Americans who are utterly unable to speak the English language with propriety, who have yet this year been made doctors by our dental colleges. I presume every gentleman in this room knows one or more such cases. It is vain for us to apply to the colleges to withdraw their diplomas after they have been granted, even if they have the legal right to do so, unless a sufficient moral force is brought to bear upon them to induce them to do so. But this Association certainly is able to exert an influence of which it does not seem yet to be fully aware. Not many years ago, if I remember aright, it called into being, through a resolution, the Association of Dental Faculties. At the present moment there is in existence another Association which it seems to me can be at least somewhat influenced by this Association, and which can have a very great influence upon the questions which have been brought before us, and that Association is the National Association of Dental Examiners. Now, between the National Association of Dental Examiners and the Association of Dental Faculties, this question can be settled. But our moral weight as a representative Association, with members from all the States of the Union, will have to be brought to bear upon these two bodies. If we have a National Board of Dental Examiners, with a formulated standard of dental education, then the colleges may safely and properly consign to that

Board the examination of their students. Then, and then only, as I can now see, may the States properly accept the diplomas each of the other. To-day, New York has the most stringent law that I know anything about. It is the law which I suppose one of the speakers (Dr. Rhein) alluded to when he said it had not yet been adjudicated upon and very likely might be upset. Possibly this is true; but, while it may be called illiberal and while it has not yet been passed upon by the courts, it is a law which I believe was earnestly and conscientiously formulated for the purpose of elevating the standard of dental education in the State. It is not possible in New York for one now to commence the study of dentistry in the colleges until he shall be able to speak the English language and write it with ordinary facility, besides being able to pass an ordinary High School examination. That is not true of all the States of this Union. New York has set the example. If now this body will give its support to such conditions as will enable the National Association of Dental Examiners to formulate and establish a standard of dental education, then we shall reach something that is practicable, and I earnestly hope this body will be able to do just that thing.

DR. STAINTON: Mr. President, it is a little unfortunate, I think, that the combination of circumstances is such that papers requiring care and labor in their preparation have to be passed without much discussion. In fact, I do not think we have awakened to the discussion yet in this Asbury Park meeting. In the State Dental Society last week there seemed to be little spirit of discussion, and the pressure of business is such in the American Dental Association that we shall probably not go into the discussion very deeply,

I wish to reiterate a point or two that I made in the paper that I read last night which ought not to be lost sight of. For instance, if you watch the record of dental schools, it is something instructive to see the number,—thirty-three in 1891, thirty-nine in 1892,—and then a drop off. I suppose four or five Chicago schools have passed out of existence probably. It is the easiest thing in the world to manufacture dental schools, but to manufacture them of good character is another thing. I do not think it is out of the question for us to pay some heed to that question and to consider it fully, and I do not think the measures I proposed last night are too ultra.

Now, I probably have more faith in the Association of Faculties than the Association of Faculties has in itself. You know it is the easiest thing in the world for an outsider, who does not know all the

ins and outs, to have faith where he would not have it if he did know them. Some of the strongest commercial firms that I know of, when you get to know their inside history, show that there is really strife, bitterness, and contention, and danger of breaking up and dissolution. A knowledge of that fact weakens your faith in them, but outsiders do not know this. That may be true of the Faculties Association, but I do not think it is overmuch to ask that the Faculties Association insist that in our specialty their permission be asked for the formation of dental schools, and the illustration I used in regard to churches is germane. When we ask medical and pharmaceutical schools to ask our permission before founding dental schools we are only asking a reasonable thing, and we have a right to do it. The argument of Dr. Fillebrown last night was not, I think, at all pertinent. He refers to half a dozen denominational churches being built, Unitarian, Presbyterian, and so on. Now, I should not be afraid to wager that each one of those churches got the consent of its own denomination. It did not ask the other denominations. Every strong religious organization is compelled to take that ground, and we shall be compelled to do so sooner or later. I want to call your attention to the fact early enough, so that we shall do it in good time, and the lessons taught by these figures which I have exhibited here are lessons which we ought not to forget. The figures I have given you are safe. People say, "Are you not overestimating? Is it possible we have so many?" Take that list of fifty cities, and, with the exception of Buffalo, New York, Washington, and Brooklyn, probably not more than four out of the fifty, in their lists of dentists, are up to the true figure. We have over seven thousand, and probably seven thousand five hundred, dentists in that list of fifty cities. Carrying that proportion out, instead of having 32,000 dentists in the United States, we have a great many more than that. The estimate of 25,000 which I have given you is, I am sure, perfectly safe, although it is surprising to you and was surprising to me.

I think it is unfortunate that such a subject as this can so rarely be discussed in its true relation. I think the remarks brought in last night in regard to plumbers' associations and trades unions are not germane. If you hear a man always talking about his honesty, you are pretty sure to have doubts about it, are you not? And when a man comes to the discussion of questions like this and makes such remarks as were made last night, you are at once suspicious that he has graduated into dentistry from plumbing, or trades unions, or

something of that sort. Let us discuss these things on a broad professional basis, and not degenerate into such figures of speech. I hope, when this paper is printed in the Transactions, you will pay more attention to it than you could do in the hasty reading.

There is one thing more on which I am inclined to test the disposition of this Association. I read you last night a partial showing from the clientele of about thirty dentists. It might be possible at this meeting to get fuller data if we were disposed to go into the subject. What I attempted to do was to get the number of persons who constituted a dentist's clientele. What I mean by that is not the people who come to have teeth extracted. I do not think they ought to be counted at all. Teeth have been extracted from time immemorial. That is not strictly a part of dental practice. If one hundred of you would send me that sort of data, it would be valuable. It would not be valuable if twenty-five did it. I am inclined to test the disposition of this audience. I will put my name and address on the board here if I can get a show of hands which will make it worth while. What I should like to get is this: If you could look over your own dental books and send me an approximately accurate list of the number of persons constituting your clientele, by which I mean persons for whom you have worked in the past two or three years, not counting the same person twice, that will give me what I want. If it is a person who has had a plate made and nothing else, or the teeth cleaned, or a filling or two put in, he may have gone to somebody else within the two or three years, and somebody else may have come to you, which would make the average about right. If I could collect such data from a sufficient number to make it anything that would give an intelligent idea of the average, I think it would be valuable. So far as I know, the effort of Dr. Thomas in Philadelphia to collect such figures is the most elaborate next to my own attempt. A showing from two hundred to five hundred dentists would not give an absolutely correct average, but it seems to me that in this Association there are enough that might do that, if they are so disposed, to give us a pretty good idea. If you will send me the data I will put it in a foot-note in our Transactions. Now I want to ask you all who will try to do that in the next week to just raise your hands. [Hands shown.] Well, that means about twenty-five. That really would not amount to very much. If there were one hundred I should be willing to do it.

DR. CROUSE: I think I can make a proposition that will solve this

problem of how to prevent the multiplication of colleges, and that is by not allowing them to charge a fee for the clinical work. These colleges start with several men joining their forces to make money, and they put out a sign, "Dental Infirmary." You will find five or six signs in Chicago now, "Dental College," with no name attached. That is to get people to go in and have their teeth filled for nothing, or to get it done cheaply, as they think. So they run along until some enterprising individual comes in and buys up the plant. He gets their charter and starts a college, and he induces some one to lecture. Then in a year or two they apply to the college faculty association, and it, seeing no way to shut them out, lets them in. I venture to say there are one hundred in process of hatching throughout the country now. I have great faith in the theory that when a thing gets so bad in politics, or in anything else, that the lazy but honest people cannot stand it any longer, then they become aroused and the matter regulates itself. And I have just the same faith in the dental profession.

Now, it may be well to look into this question from a business standpoint. It is well known that the infirmaries or colleges are a source of revenue, and that would be all right if it stopped there, but the trouble is that these people who do not have any college want to get up one. I have been approached within a month and asked to join one of these institutions that has been running for some time. They said, "Come into it and blow it along with the *Digest*, and our professors will write for the *Digest*." And I said, "What else?" "And then we want about ten thousand dollars." "Well, what do you want ten thousand dollars for?" "We want to fix up a fine place, so people will come in and get their teeth fixed, and it will pay." Well, I did not accept the proposition. The fact that they can fool the community is the reason why so many colleges start.

There is another thing which I want to bring before this Association for its earnest thought. There are less than five thousand dentists who belong to any society or who are associated with any body connected with the profession, unless it is some runner selling goods. How are you going to get at the fifteen thousand or sixteen thousand others? You must remember that there are a great many men who are called dentists, who have signs, but whose signs move rapidly. Take the registry list of a State that is accurate when it is made and send circulars out by it three months after, and fifteen or twenty per cent.

of them are not there. The circulars will be returned, because they have moved away. You count them a great many times to make up the list, but there are plenty of the undesirable kind, though I think the quality will improve gradually. It will do so just as fast as the community begins to understand the facts, and they are getting to understand them rapidly. Now, if this Association could get the societies to affiliate with them more and do more, and then if the societies would broaden themselves out and get more members, a great deal more could be done. There are plenty of good men in every State who never go anywhere. I have found them, and been surprised when I have asked them, "What society do you belong to?" to have them answer, "I don't belong to any." "Don't you belong to the State Association?" "No." There are towns in Illinois, like ———, which have perhaps only one member of the profession who belongs to any society. I believe it was last year that he joined, and they were all asked by letter to join. That is one trouble which must be met in dealing with the tail end. The colleges must send out only men of intelligence, who will associate with other men of intelligence, and eventually the tail will slough off, and by death and other means the profession will be improved.

DR. JACK: You will not have failed to observe that the purpose of the second paper of last evening was to show the necessity for care in respect of the admission of new schools. In order that a higher level might be reached, the Association of National Examiners in looking over the subject, and in considering what procedure they could take that would assist in bringing about a better average standard, formulated the following rules for the government of their action in the future. It is entitled, "A Plan of Requirement for the Recognition of New Dental Schools:"

"That each dental school which may in future come before this Board for recognition must have a teaching faculty composed as follows, to wit: At least three professors of dental subjects, namely, for operative dentistry, for dental prosthetics, for dental pathology and therapeutics. For the medical subjects there must be at least five professors, namely, for anatomy, for physiology, for chemistry, for pathology, and for materia medica.

"Its students must also be taught the subjects of chemistry and bacteriology in laboratories adapted to the purpose, and under suitable instructors.

"That such special school must possess, in addition to suitable

lecture-rooms, a well-appointed dental infirmary and a general prosthetic laboratory; also, each school must be provided with a room or rooms suitable for manual training in operative dentistry, and must furnish in this way systematic instruction to its students.

"All of these provisions are to be determined by careful inspection on the part of the Board of Examiners of the State within which the school making application is located, or other authorized body duly indorsed by this Association. Upon the result of this examination will depend the question of reputability."

The purpose of these rules is to restrict the recognition of new schools that are not up to this standard. The result of such action must be to commence a leveling upward of the schools which are below this standard. That will be easily recognized by all my hearers.

DR. SHEPARD: I have been exceedingly pleased with the remarks of Dr. Crouse, and in my opinion he has presented the only solution to this question. I do not know that I ever heard a proposition made which seemed so apt and to the point. It has been stated frequently, and seems to be true, that colleges have been opened where not needed for purely educational ends, but mainly for the profits to be secured from the infirmary, and that such colleges are an injury to the good colleges, to the cause of education, to the profession, and to the public. It is a pertinent question whether the manner of conducting their infirmaries by the recognized reputable colleges may not be largely responsible. The impression is given out, if the statement is not explicitly made, that what is charged in the infirmaries is to cover the cost of valuable materials. Colleges vary greatly in their infirmary charges. In two addresses which I made some four or five years ago, and which were printed in the *Dental Cosmos*, I published some statistics on this subject which I had taken some pains to gather. I mentioned one instance of a college charging seventy-five cents per sheet for gold foil, and to make it more profitable served to the students No. 3 gold; while another college charged but forty cents per sheet for No. 4 foil. This is about a fair charge. In most colleges, at that time, the fee for oxyphosphate or gutta-percha fillings was twenty-five cents.

Now, if it is a fact that the impression prevails among the public, and is so given out by the colleges, that the services in the infirmaries are free, and the charge is for the expense of the material, we all know whether this is true or not.

I have been told by dentists who claim to know something of these matters, and who are reputable men, that the profits from infirmaries of some colleges are very large—ten and twenty thousand dollars per year.

I do not pretend to be familiar with the systems of all colleges, and have made no inquiries since the time referred to; but if it is to-day true that the infirmary, as a rule, is an element, and a large element, of profit to the school, the solution suggested by Dr. Crouse is an admirable one and will meet the case.

For some years I have been promising to do something, and have done a little in the way of securing an answer to the question why, in the minds of liberally educated people, particularly physicians and people most familiar with eleemosynary labors, we have not had accorded to us the rank which we claim, either as a liberal profession or as a specialty of medicine. The great reason why that has not been granted to us is that in the line of thought in connection with medical services we are not a liberal profession. Where in this country can you point to a hospital which is a dental hospital pure and simple? There is not one in this country. Go over the list of the twenty-five thousand dentists here, and how many of them are giving up one-half day every week to services for the benefit of the poor in their special lines? You can count them perhaps upon your fingers throughout the whole country. Look at the medical profession. Look at the hospitals. Every town and city of twenty-five thousand inhabitants has its hospital. The services are free. The physicians go there day after day, giving more or less valuable time free in efforts to benefit and ameliorate the condition of the sick and suffering.

When we can hold up our heads and look the medical men in the face, and say that we are liberal, not with our money, but what is the more valuable, our skilled services and the services of the most skilled among us, then can we claim to stand on a par with the medical practitioners as a liberal profession, doing our duty under the great, broad principle which overlies and underlies and permeates all these medical services to the people to alleviate human suffering. I have thought a great deal upon this subject, and have intended to write upon it. I introduced a proposition at the late Congress, and advocated the appointment of a committee to report on the care of the teeth of the poor. Such a committee was appointed. Its report, I am sorry to say, did not amount to much, but it is a vital question for us to take up. What are we to do for the teeth of the

poor? We must meet it sooner or later, or we shall fail to grow to the stature which we aim for, and to which I hope to live to see our profession arrive.

DR. TRUMAN: There has not been a year since I have been connected with this Association that somebody has not assailed the colleges of this country; and when a man stands up here and asserts that there is not a college in this country that is not a fraud, I think it is time for this Association to stop and consider what they are doing. It is not true; at least, it is not true of all colleges. I know very well that in the college with which I am connected no such state of things exists, and I believe it to be true of a majority that there is an endeavor to work for the poor at the lowest possible cost price. Now, we hear much talk of doing work for nothing. I do not know that any one in this audience works entirely without a money recognition for services rendered, nor do I think it is good policy ever to give a thing without some remuneration. In the school with which I am connected there is only made a small charge for gold. All the rest is given gratuitously, every bit of it. Now for one to come before this audience and make wholesale charges against educational institutions that have been for the last forty years building up the profession, is disgraceful, and it is to the discredit of this body that they listen to it.

Talk about treating the poor! I have had over thirty years' experience in that business, and I know it is impossible to get the very poor into the colleges. I have used every effort, but it cannot be done—and why? Simply because the very, very poor cannot spend the time for extended operations. Time is money to them. When the effort is made to compare dental schools with medical dispensaries, it is absurd. We never can reach that point. The poor man or woman can go into a dispensary and secure a prescription made up for him in five minutes. Persons similarly situated can come to a dental college, and they must remain from one to two or three hours before they can be served. Is there any comparison? There is not, and I am tired of this thing. I have heard it year in and year out. The colleges are denounced, when, as I said before, they are doing their very best to elevate the profession.

DR. H. A. SMITH: I wish to controvert the statement which Dr. Shepard has made, and to confirm what Dr. Truman has said, as to what the dental colleges are doing for the deserving poor.

The institutions with which I am most familiar have hospital con-

nections, treat the poor in their infirmaries free, and care for the orphans. I may mention one orphan asylum in which more than one hundred children receive treatment continuously and gratuitously. In hospital work no fees are received. Not only this, but the after-care of the patients, if need be, is paid for by the colleges. I mention these things to show you that our colleges are doing true charitable work alike with medical schools. If Dr. Shepard was more familiar with the management of dental colleges of the day, he would not make the unjust criticisms and comparisons which he does. The earnings and profits of dental clinics are, in my opinion, greatly exaggerated, just as the incomes in private practice are often exaggerated. We may not claim that the men connected with our dental colleges are unselfish, but I do contend that they are on occasion actuated by the same humanitarian spirit which has just been mentioned as peculiar to the medical profession engaged in similar educational work.

DR. WALKER: Mr. President, I did not expect to speak on this subject, but after listening to the three papers which were read last night and the discussion which followed, what have we learned as dentists? What has it all amounted to? It has simply amounted to this, that there are some few dentists connected with the American Dental Association who think we have too many dental colleges, and others who think we have got just about enough; and I have narrowed it down to this, that there is room for many more dental colleges if they will only place their standard high enough. That is all that I can see that we have gained out of all this discussion and time given to the several gentlemen, and it has finally ended in a sort of dispute among members of different dental colleges. I think the discussion ought to be closed, and I move that it be closed.

SECTION II.—Continued.

Report of Special Committee on Dental Nomenclature.

By S. H. GUILFORD, Chairman of the Committee.

YOUR Committee, in endeavoring to carry forward the work it was appointed to perform, found it beset with some difficulties. Unfortunately, all of its members are busy men, more or less constantly engaged in literary work of some kind, who found it difficult to devote the necessary time to it. In consequence of this, or from other causes, only seven of the nine appointees took any active part in the work, but those who did toiled faithfully and laboriously, as the report will testify.

The second and greater difficulty encountered was that the proposed work was rather new in character, and your Committee had very little that would serve as a guide. The very admirable report on Nomenclature prepared by Dr. Black, and read before the Columbian Dental Congress, which has been carefully considered by your Committee, furnished it with materials of considerable value, but as it dealt principally with the anatomy of the teeth and cavities, we have found it necessary to broaden the scope of our work and include, so far as we could, the terminology of the various divisions of our specialty.

The nomenclature of any science or art, like a language, is not a creation, but a growth. It starts from a small beginning and is developed gradually. At first the terms needed to express the necessary things and ideas are few, because the latter are themselves limited; but with the growth and expansion of the science new terms are required to describe the ever-developing facts, functions, and ideas.

Frequently the growth of a science or art is so rapid that the terms selected to convey the necessary ideas are chosen without a

proper regard to their fitness. Such has been the case with many sciences, and, unfortunately for us, with our own. More than this, those first engaged in a pursuit which afterward develops into a science or an art are frequently men of limited education, who probably are not fitted, even if they were inclined, to select or frame the most suitable and correct terms for the purpose. Owing to these causes, each science in its infancy has introduced into it words and phrases which, while they temporarily answer the purpose, are not really apt and not etymologically correct. With the development of the science and the coincident attraction to its ranks of those more liberally educated, the incorrect or inefficient terms are gradually eliminated and their places supplied by better ones. This process is a slow one, for words, like tools, even though lacking in highest efficiency, become endeared to the average man through long association. For this reason it would be impossible, even if we were inclined, to make any sweeping change in our terminology. As in our civil life it is found difficult to enact a law much at variance with previous custom, or, if enacted, to enforce it, so, in professional or scientific matters, any proposed radical change would meet with sufficient opposition to defeat it.

We must move slowly and carefully, and advance only as rapidly as we succeed in convincing our fellows of the advisability of the change. Terms that are scientifically incorrect should be discarded at once and correct ones substituted; those that are not absolutely incorrect may be tolerated for a while longer; but for the new ones which must necessarily be introduced from time to time this Association should establish a standard or code, and use its great influence in securing its approval and adoption by the profession in this country at least.

While the establishment of a system of nomenclature of international character would be most desirable, the present does not appear to be the time at which to attempt it; but if we can devise and adopt a system for our own country that has a scientific basis and is well adapted to our wants, we believe that it will eventually be adopted in whole or in part by other nations. The framing of a code is a task of considerable difficulty, for no one language contains all of the elements from which to construct a perfectly correct and convenient nomenclature.* A living language will not do, because it is constantly changing. The choice, therefore, would seem to lie between one of the two dead languages, Latin or Greek. Latin

possesses the advantages of large scope, of being more easily read and understood than Greek, and of furnishing the roots upon which a large proportion of the English derivatives have been constructed. Its chief objection is that its pronunciation has undergone great change in the past quarter of a century, and we are not certain that it will be free from future changes.

Greek, on the other hand, has suffered no change in our generation, either in form or pronunciation; and while it is less easily read and translated by those whose classical education has been limited, it is probably richer in etymological possibilities than Latin. These advantages of the latter language seem to have been recognized and appreciated by the collateral sciences, for nearly all of the new terms introduced in them of recent years are of Greek origin.

In the science of electricity, and indeed physics in general; in geology and mineralogy; in theology; in medicine and surgery, especially in the departments of bacteriology and pathology,—almost the entire list of recent terms is constructed from Greek roots. If, therefore, these sister sciences have deemed it best and most satisfactory to base their newer terminology upon a Greek foundation, can we do better than follow their example and keep in scientific accord?

In case we decide to accept the Greek language as a basis for our terminology, however, it does not follow that we must adhere to it rigidly in all cases, for in many instances, no doubt, the Latin, English, or other languages will furnish us with terms that are equally as good, and probably simpler in form than corresponding ones derived from the Greek.

Whichever language is taken as a basis, it will be necessary to select root words, as far as possible, in each department or section of our nomenclature, and from these, by the addition of prefixes or suffixes, or by combination, to form a group of words having the same basis. Thus in our present nomenclature, taking the Latin word "cementum" as a base, we have constructed the words "pericementum," "pericementitis," "hypercementosis," each one expressing a different idea, yet all relating to a certain tissue or its immediate associations.

In the naming of tissues or parts or surfaces of teeth, this method should be adhered to, because it is scientific and systematic; but where a part to be named is not complicated by its surroundings, we may use more freedom in the selection of terms. In like manner, where a term has proven satisfactory and has become well established

through long usage, as the word "root," or where others equally satisfactory have been appropriated from some collateral science, as "quartz," "feldspar," and "kaolin" (the first being of unknown, the second of German, and the last of Chinese origin), it will be well to retain them, regardless of their etymological variation.

Very many of our present terms have a Latin derivation, having been borrowed from our sister profession, medicine, and where these have proven satisfactory and are not etymologically incorrect, we may allow them to remain. Many also have their foundation in Greek, as gypsum, asbestos, prosthesis, technics, etc., while a few, like celluloid, centimeter, etc., are half Latin and half Greek. In the descriptive anatomy of the teeth, your Committee is well pleased with the plan and terms proposed by Dr. Black two years ago, but some modification of that plan will probably be necessary.

Inasmuch as the terms used by common consent to indicate four of the surfaces of the crown of the tooth end in the Latin adjective termination "al," your Committee favors the adoption of a word having the same ending for the fifth or antagonizing surface. Whether this shall be *occlusal* for the bicuspids and molars and *incisal* for the incisors, as suggested by Dr. Black, or *morsal* for all, as proposed by Dr. Kirk, remains to be determined. Your Committee believes that the use of the single term *occlusal* for this surface of all of the teeth will serve our purpose best. As between the words *gingival* and *cervical* we recommend the adoption of the latter, because it is exact in its meaning and has the sanction of long use.

In naming the teeth themselves, we strongly condemn the use of such unscientific terms as "sixth-year molar," "twelfth-year molar," and "wisdom-tooth," and urge instead designating them first, second, and third permanent molars respectively.

We also believe it to be more harmonious and appropriate to use the word *cuspid* instead of *canine* to indicate the single-cusped teeth, just as the term *bicuspid* is applied to their adjoining neighbors. So, also, in indicating a particular tooth, it is more methodical and correct to proceed from the general to the particular, naming first the jaw, then the side, and lastly the tooth, as "superior, left, second molar."

The elision of the final vowel in such words as dentin, iodin, etc., as approved by such authorities as the Century and Standard Dictionaries, your Committee heartily concurs in and recommends.

This report would be extended to too great a length if it were to

specify the many terms whose ill-use has beclouded our terminology, but so far as we have been able to go, the results of our investigations will be found in the tabulated form accompanying this report, and which we trust will be easily understood. In it we give, beside the word itself, its orthography, the pronunciation, part of speech, and the decision of several authorities as to its proper use. When a word has two forms of orthography, the preferred one is indicated, and so also the different shades of meaning of synonymous words are noted in the column for remarks. The authorities consulted are the Century and Standard Dictionaries, and Dunglison's, Gould's, and Thomas's Medical Dictionaries.

Your Committee would beg to remind the Association that this report marks but the beginning of its labors, and that much time and effort will be required to obtain anything like a complete or satisfactory result. If what we have thus far done should receive from the profession the careful consideration that the importance of the subject demands, and if enough interest is elicited to cause the subject to be brought before the various Local and State Societies during the coming year for intelligent discussion, criticism, and suggestion, your Committee will be greatly aided in its future work.

Committee { S. H. GUILFORD, *Chairman*,
LOUIS OTTOFY,
E. C. KIRK,
A. H. THOMPSON,
GRANT MOLYNEAUX,
T. E. WEEKS,
C. L. GODDARD.

Word.	Pronunciation.	Committee's Preference.	Part of Speech.	Century.	Dunglison.	Gould.	Thomas.	Standard.	Definition.
Abnormality	ab-nor-mal'-i-ti		n	×	×	o	o	×	The state or quality of being abnormal; irregularity; deformity; malformation.
Abnormity	ab-nor'-mi-ti	×	n	×	o	o	o	×	Same as abnormality.
Abrasion	ab-ra'-zhon		n	×	×	×	×	×	1. The act or process of rubbing or wearing away. 2. That which is rubbed off.
Remarks.—Sometimes used erroneously for "erosion."									
Abscess	ab'-ses		n	×	×	×	×	×	A cavity containing pus, the result of a localized inflammation.
Absorption	ab-sorp'-shun		n	×	×	×	×	×	The act, process or condition of being absorbed; permeation or imbibition of one body by another; process whereby nourishment, morbid products, etc., are taken up by venous or lymphatic system. Applied to the retrograde changes that take place in the roots of teeth and alveolar process. *Resorption* expresses this change more exactly.
Acrodont	ak'-ro-dont		a	×	o	o	×	o	Having teeth anchylosed on parapets of bone on the edges of the jaw (as found in some lizards).—*Huxley.*
Adenoid	ad'-e-noid		a	×	×	×	×	×	Glandiform; glandular; as, *adenoid* growths or vegetations.
Adjustable	ad-jus'-ta-bl		a	×	o	o	o	×	Capable of being adjusted.
Air-chamber			n	×	×	o	o	×	A recess in the center of the palatal portion of upper dentures. A cavity or inclosed space containing air; an air-cell.
Alloy	al-loi'		n	×	×	×	×	×	A compound or mixture of two or more metals; commonly restricted to compounds of metals produced by fusion.
Alloy	al-loi'		v	×	o	o	o	×	To reduce the purity of, or otherwise modify metals, by admixture.
Aluminium	al-u-min'-i-um		n	1	×	×	2	2	Old spelling.
Aluminum	a-lu'-mi-num	×	n	2	o	o	1	1	A white metal, at. wt. 27, S. G. 2.6, malleable, ductile. Insoluble in most acids.
Alveolar	al-ve'-o-lar	×	a	1	o	×	×	o	Pertaining to the alveoli or sockets of the teeth; as, *alveolar* arch, *alveolar* border.
Alveolar	al'-ve-o-lar			2	o	o	o	×	
Alveolar process									The bone raised on the margins of the maxillary bones which envelops the roots of the teeth and forms their alveoli.—*Black.*
Alveolo-dental	al-ve'-o-lo-den'-tal		a	×	×	×	o	o	Pertaining to the teeth and their sockets. Designating the membrane which lines the alveoli and invests the roots of the teeth.
Alveolus (Pl., al-ve'-o-li.)	al-ve'-o-lus		n	×	×	×	×	×	The socket of a tooth.

×, Given by author; o, Not given by author; a, Adjective; n, Noun; v, Verb; ×, in "Committee's Preference," means the Committee's choice; 1, Preferred; 2, Allowable.

Amalgam	a-mal'-gam		n	×	×	×	×	×	An alloy or union of mercury with another metal.
Amalgamate	a-mal'-ga-mate		v	×	o	o	o	×	To unite a metal in an alloy with mercury. To form an amalgam.
Anæsthetic	an-es-thet'-ik		n	2	1	2	×	×	Same as anesthetic.
Remarks.—The original form of the word.									
Anesthetic	an-es-thet'-ik	×	n	1	2	1	o	×	A substance which lessens or prevents pain; divided into general and local.
Anastomose	an-as'-to-moze		v	×	×	o	×	×	To unite or connect by anastomosis; inosculate.
Anchorage	an'-kor-age		n	×	×	×	o	×	The points of the fixation of fillings, or artificial crowns.
Anchylosis	an-ki-lo'-sis		n	×	×	×	×	×	The growing together of two bones or parts of bones. Applied to the union of teeth to the jaw-bone.
Anemia	an-e'-mia		n	×	×	×	×	×	A deficiency of blood.
Angle	an'-gl		n	×	×	×	×	×	The line or point where two or more surfaces of the teeth join. —*Black.*
									Line angle. Angle formed by union of two surfaces. *Point angle* or *solid angle.* Angle formed by union of three surfaces. Used in descriptive anatomy of the teeth.
Anisognathous	an-i-sog'-na-thus		a	×	o	o	o	×	Having the upper jaw of greater transverse diameter than the lower.—*Ryder.*
Anomalous	a-nom'-a-lus		a	×	×	×	×	×	Deviating from that which is natural.
Anomaly	a-nom'-a-li		n	×	×	×	×	×	Deviation from ordinary or normal forms.
Anterior	an-te'-ri-or		a	×	×	×	×	×	Situated in front.
Anteversion	an-te-ver'-shun		n	×	×	×	o	×	A turning forward.
Antiodontalgic	an-ti-o-don-tal'-gic		a	o	×	×	×	o	Curative of the toothache.
Antiseptic	an-ti-sep'-tik		a-n	×	×	×	×	×	*a.* Preventing putrefaction, fermentation, etc.; *n.* anything that restrains or destroys the growth of putrefactive micro-organisms.
Apex (Pl., ap'-i-seez)	a'-peks		n	×	×	×	×	×	The pointed end or highest point; top. Applied to the terminal end of the root of a tooth.
Aphthæ	af'-thee		n	×	×	×	×	×	Small round ulcers which occur upon the tongue, gums, lips, and palate.
Aphthous	af'-thus		a	×	×	×	×	×	Characterized by or affected with aphthæ.
Apical	ap'-i-kal		a	×	×	×	o	×	Situated at or belonging to the apex or top; as *apical* foramen.
Apical Foramen			n	×	o	o	o	×	The minute opening in the apex of the root of a tooth through which the nerves and blood-vessels enter to supply the tooth-pulp.—*Black.*
Apparatus	ap-pa-ra'-tus		n						
Approximal	ap-proks'-i-mal		a	×	o	×	×	×	Close together; said of the surfaces of teeth.
Approximate	ap-proks'-i-mate		a	×	×	o	×	×	Nearly but not exactly accurate; as, an *approximate* result.
Arch	arch		n	×	×	×	×	×	In dentistry applied to the curve made by the upper or lower teeth.
"Aristotle's Lantern"			n	×	o	o	o	×	The dental apparatus of Echinus.
Arthritic	ar-thrit'-ik		a	×	×	×	×	×	Pertaining to the joints or to the gout, as gouty teeth.
Articulate	ar-tik'-u-late		v	×	o	×	o	×	To joint together; to unite by means of a joint.
Remarks.—Used erroneously for "occlude."									
Articulation	ar-tik-u-la'-shun		n	×	×	×	×	×	The union forming a joint, as of bones.
Remarks.—Used erroneously for "occlusion."									

Word.	Pronunciation.	Committee's Preference.	Part of Speech.	Century.	Dunglison.	Gould.	Thomas.	Standard.	Definition.
Abnormality	ab-nor-mal'-i-ti		n	×	×	o	o	×	The state or quality of being abnormal; irregularity; deformity; malformation.
Abnormity	ab-nor'-mi-ti	×	n	×	o	o	o	×	Same as abnormality.
Abrasion	ab-ra'-zhon		n	×	×	×	×	×	1. The act or process of rubbing or wearing away. 2. That which is rubbed off.
Remarks.—Sometimes used erroneously for "erosion."									
Abscess	ab'-ses		n	×	×	×	×	×	A cavity containing pus, the result of a localized inflammation.
Absorption	ab-sorp'-shun		n	×	×	×	×	×	The act, process or condition of being absorbed; permeation or imbibition of one body by another; process whereby nourishment, morbid products, etc., are taken up by venous or lymphatic system. Applied to the retrograde changes that take place in the roots of teeth and alveolar process. *Resorption* expresses this change more exactly.
Acrodont	ak'-ro-dont		a	×	o	o	×	o	Having teeth anchylosed on parapets of bone on the edges of the jaw (as found in some lizards).—*Huxley.*
Adenoid	ad'-e-noid		a	×	×	×	×	×	Glandiform; glandular; as, *adenoid* growths or vegetations.
Adjustable	ad-jus'-ta-bl		a	×	o	o	o	×	Capable of being adjusted.
Air-chamber			n	×	×	o	o	×	A recess in the center of the palatal portion of upper dentures. A cavity or inclosed space containing air; an air-cell.
Alloy	al-loi'		n	×	×	×	×	×	A compound or mixture of two or more metals; commonly restricted to compounds of metals produced by fusion.
Alloy	al-loi'		v	×	o	o	o	×	To reduce the purity of, or otherwise modify metals, by admixture.
Aluminium	al-u-min'-i-um		n	1	×	×	2	2	Old spelling.
Aluminum	a-lu'-mi-num	×	n	2	o	o	1	1	A white metal, at. wt. 27, S. G. 2.6, malleable, ductile. Insoluble in most acids.
Alveolar	al-ve'-o-lar	×	a	1	o	×	×	o	Pertaining to the alveoli or sockets of the teeth; as, *alveolar* arch, *alveolar* border.
Alveolar	al'-ve-o-lar			2	o	o	o	×	
Alveolar process									The bone raised on the margins of the maxillary bones which envelops the roots of the teeth and forms their alveoli.—*Black.*
Alveolo-dental	al-ve'-o-lo-den'-tal		a	×	×	×	o	o	Pertaining to the teeth and their sockets. Designating the membrane which lines the alveoli and invests the roots of the teeth.
Alveolus (Pl., al-ve'-o-li)	al-ve'-o-lus		n	×	×	×	×	×	The socket of a tooth.

×, Given by author; o, Not given by author; a, Adjective; n, Noun; v, Verb; ×, in "Committee's Preference," means the Committee's choice; 1, Preferred; 2, Allowable.

Amalgam	a-mal'-gam		n	×	×	×	×	×	An alloy or union of mercury with another metal.
Amalgamate	a-mal'-ga-mate		v	×	o	o	o	×	To unite a metal in an alloy with mercury. To form an amalgam.
Anæsthetic	an-es-thet'-ik		n	2	1	2	×	×	Same as anesthetic.
Remarks.—The original form of the word.									
Anesthetic	an-es-thet'-ik	×	n	1	2	1	o	×	A substance which lessens or prevents pain; divided into general and local.
Anastomose	an-as'-to-moze		v	×	×	o	×	×	To unite or connect by anastomosis; inosculate.
Anchorage	an'-kor-age		n	×	×	×	o	×	The points of the fixation of fillings, or artificial crowns.
Anchylosis	an-ki-lo'-sis		n	×	×	×	×	×	The growing together of two bones or parts of bones. Applied to the union of teeth to the jaw-bone.
Anemia	an-e'-mia		n	×	×	×	×	×	A deficiency of blood.
Angle	an'-gl		n	×	×	×	×	×	The line or point where two or more surfaces of the teeth join. —*Black.*
									Line angle. Angle formed by union of two surfaces. *Point angle* or *solid angle.* Angle formed by union of three surfaces. Used in descriptive anatomy of the teeth.
Anisognathous	an-i-sog'-na-thus		a	×	o	o	o	×	Having the upper jaw of greater transverse diameter than the lower.—*Ryder.*
Anomalous	a-nom'-a-lus		a	×	×	×	×	×	Deviating from that which is natural.
Anomaly	a-nom'-a-li		n	×	×	×	×	×	Deviation from ordinary or normal forms.
Anterior	an-te'-ri-or		a	×	×	×	×	×	Situated in front.
Anteversion	an-te-ver'-shun		n	×	×	×	o	×	A turning forward.
Antiodontalgic	an-ti-o-don-tal'-gic		a	o	×	×	×	o	Curative of the toothache.
Antiseptic	an-ti-sep'-tik		a-n	×	×	×	×	×	*a.* Preventing putrefaction, fermentation, etc.; *n.* anything that restrains or destroys the growth of putrefactive micro-organisms.
Apex (Pl., ap'-i-seez)	a'-peks		n	×	×	×	×	×	The pointed end or highest point; top. Applied to the terminal end of the root of a tooth.
Aphthæ	af'-thee		n	×	×	×	×	×	Small round ulcers which occur upon the tongue, gums, lips, and palate.
Aphthous	af'-thus		a	×	×	×	×	×	Characterized by or affected with aphthæ.
Apical	ap'-i-kal		a	×	×	×	o	×	Situated at or belonging to the apex or top; as *apical* foramen.
Apical Foramen			n	×	o	o	o	×	The minute opening in the apex of the root of a tooth through which the nerves and blood-vessels enter to supply the tooth-pulp.—*Black.*
Apparatus	ap-pa-ra'-tus		n						
Approximal	ap-proks'-i-mal		a	×	o	×	×	×	Close together; said of the surfaces of teeth.
Approximate	ap-proks'-i-mate		a	×	×	o	×	×	Nearly but not exactly accurate; as, an *approximate* result.
Arch	arch		n	×	×	×	×	×	In dentistry applied to the curve made by the upper or lower teeth.
"Aristotle's Lantern"			n	×	o	o	o	×	The dental apparatus of Echinus.
Arthritic	ar-thrit'-ik		a	×	×	×	×	×	Pertaining to the joints or to the gout, as gouty teeth.
Articulate	ar-tik'-u-late		v	×	o	×	o	×	To joint together; to unite by means of a joint.
Remarks.—Used erroneously for "occlude."									
Articulation	ar-tik-u-la'-shun		n	×	×	×	×	×	The union forming a joint, as of bones.
Remarks.—Used erroneously for "occlusion."									

Word.	Pronunciation.	Committee's Preference.	Part of Speech.	Century.	Dunglison.	Gould.	Thomas.	Standard.	Definition.
Asepsis	a-sep′-sis		n	×	×	×	o	×	Absence of blood-poisoning; exemption from putrefaction and its consequences.
Aseptic	a-sep′-tik			×	×	×	o	×	Free from disease-germs or tendency to putrefaction.
Asphyxia	as-fik′-si-a		n	×	×			×	The suspension of vital phenomena when the lungs are deprived of air.
Assimilation	as-sim-i-la′-shun		n	×	×	×	×	×	The act or process by which organisms absorb and convert nutriment.
Asymmetry	a-sim′-e-tree		n	×	×	×	o	×	Absence of symmetry.
Atavism	at′-a-vizm		n	×	×	×	×	×	Recurrence or tendency to recur to an ancestral type; intermittent heredity.
Atrophy	at′-ro-fee		n	×	×	×	×	×	A gradual wasting of the body, usually attended by fever; loss of appetite and impaired digestion.
Attrition. *Remarks.*—Sometimes synonymous with "abrasion."	at-trish′-un		n	×	×	×	×	×	The act of wearing out by rubbing or grinding down by friction, or the state of being so worn.
Automatic	aw-to-mat′-ik		a	×	×	×	×	×	A term applied in physiology to those functions which are performed independently of the will.
Axial	ak′-si-al		a	×	×	×	×	×	Term applied to all surfaces, walls and lines parallel to the long axis of a tooth.
Basal	ba′-sal		a	×	o	o	o	×	Of, pertaining to, situated at, or forming the base; fundamental. A term suggested and adopted by several teachers to express the bottom or floor of cavities in the occlusal surfaces.
Bell-crowned			a	o	o	o	o	o	Applied to a tooth-crown which is largest at the occlusal surface and tapers toward the cervix.—*Black.*
Bibulous	bib′-u-lus		a	×	×	×	o	×	Having the property of absorbing fluids. *B-paper*, paper used for absorbing the moisture from dental cavities.
Bicuspid	bi-kus′-pid		n	×	×	×	×	×	The premolar of man. (A tooth with two cusps.)—*Harris.*
Bifurcated	bi-fur′-ka-ted		a	×	o	×	×	×	Divided in two in fork form, as the roots of the inferior first and second molars, or in many cases, of the superior first bicuspid.
Bifurcation	bi-fur-ka′-shun		n	×	×	×	×	×	The division into two; a fork.
Body	bod′-i		n	×	×	×	×	×	Applied to a tooth crown *in toto*. In prosthetic dentistry, the siliceous basis of porcelain which is overlaid by enamel.
Brachycephalic	brak′-i-se-fal′-ik	×	a	1	1		×	×	Having a skull the transverse diameter of which is more than eight-tenths of its long diameter. (Applied to egg-shaped skulls, larger behind.)—*Gould.*
Brachycephalic	brak′-i-sife′-a-lik		a	2		1			
Buccal	buk′-kal		a	×	×	×	×	×	Toward the cheek.—*Black.*
Buccally	buk′-kal-i		adv						
Buccal angles			n	×	×	×	×	×	The angles formed at the junction of the other crown surfaces with the buccal face.—*Black.*

Buccal surface			n						The surface of the tooth crown next to the cheek.—*Black.*
Bucco-cervical ridge			n						The ridge on the buccal surface of the deciduous molars near the cervix.—*Black.*
Bucco-lingual diameter			n						The diameter of the tooth crown from the cheek toward the tongue.—*Black.*
Bucco-lingually	buc'-co-liŋ'-gwal-ly		adv	o	o	o	o	o	From the cheek toward the tongue.
Bunodont	bu'-no-dont		n	×	o	o	o	×	Tooth crown supporting tubercles.—*Cope.*
Calcareous	kal-ka'-re-us		a	×	×	×	×	×	Composed of or containing lime.
Remarks.—This and calcific are often (erroneously) used interchangeably. Calcific relates to calcification.									
Calcific	kal-sif'-ik		a	×	o	o	o	×	Forming lime; calcifying.
Remarks.—(See Calcareous.)									
Calcification	kal-si-fi-ka'-shun		n	×	×	×	o	×	The deposit of calcium salts in the tissues or organs of the body. Includes the impregnation of the dentinal enamel, cemental matrices with lime salts.
Calculus	kal'-ku-lus		n	×	×	×	×	×	Salivary deposits of calcium phosphate and carbonates with organic matter about the teeth or mouth. Serumal deposits upon the teeth derived from the blood serum.
Canals	ka-nalz'		n	×	×	×	×	×	The tubular cavities extending the length of the roots of the teeth and containing the branches of the dental pulp.—*Black.*
Canine	ka'-nine		n	×	×	×	×	×	The first tooth posterior to the intermaxillary suture above, and its opponent below.—*Owen.*
Canine Cusp			n						The buccal cusp of the bicuspid.—*Allen.*
Caniniform	ka-nin'-i-form		a	×	o	o	o	×	Formed like a canine,—long, slender, and pointed.
Capping	kap'-ing		n	×	o	o	o	×	A covering, as with a cap. Used to designate the substance placed immediately over an *exposed* pulp.
Caries	ka'-ri-es		n	×	×	×	×	×	The decalcification and disorganization of dental tissues due to the action of micro-organisms and their products, mainly the lactic ferments.
Carious	ka'-re-us		a	×	×	×	×	×	Pertaining to or affected by caries.
Cast	cast		n	o	o	o	o	×	An object founded or run in a mold, as of metal, plaster, etc.
Causation	kaw-za'-shun		n	×	o	o	o	×	Act, process, or result of causing; relation of cause and effect.
Cement	se-ment'		v	×	×	o	×	×	To unite or cause to hold together by means of cement; to bind closely together.
Cement	se-ment'	×	n	1	×	o	×	1	Any plastic material capable of becoming hard and binding together the objects contiguous to it; filling-material for the teeth.—*Gould.* An oxychlorid or oxyphosphate of zinc.—*Com.*
Cement	sem'-ent		n	2	o	o	×	2	Same as se-ment'.
Cemental	se-men'-tal		a	×	o	o	o	×	Pertaining to the cementum.
Cementation	se-men-ta'-shun		n	×	o	o	×	o	A chemical process which consists in surrounding a solid body with the powder of other substances, and exposing the whole to red heat in a closed vessel for a length of time.
Cementation	sem'-en-ta'-shun							×	

WORD.	PRONUNCIATION.	Committee's Preference.	Part of Speech.	Century.	Dunglison.	Gould.	Thomas.	Standard.	DEFINITION.
Cementoblasts	se-ment'-o-blasts		n	o	✓	✓	o	✓	The cells which form the cementum of the roots of the teeth.
Cementum	se-men'-tum		n	✓	✓	✓	o	✓	A tissue resembling bone which covers the outer surface of the roots of teeth.—*Black.*
Cervical	ser'-vi-kal		a	✓	✓	✓	✓	✓	Of or pertaining to a neck. Applied to that position of the tooth where the enamel and cementum unite.
Cervix	ser'-viks		n	✓	✓	✓	✓	✓	The neck of the tooth; the portion grasped by the gum,—between the crown and root.—*Black.*
Chitin	ki'-tin		n	✓	o	o	o	✓	The horny covering of insects, of which the masticating apparatus of the invertebrates is often composed.
Chloro-percha	klo'-ro-pert'-ja		n	o	-	o	o	o	A solution of gutta-percha in chloroform, forming an insoluble, transparent, and non-conducting varnish.
Cingule	sing'-gule		n	o	o	o	o	o	A small cusp or tubercle on the lingual face of a tooth.—*Allen.*
Cingulum	sing'-gu-lum		n	✓	✓	o	o	✓	The ridge or tubercle on the lingual face of a tooth near the gum.—*Owen.*
Cleavage	kleev'-aje		n	✓	✓	✓	✓	✓	The property of breaking readily in one or more directions, as enamel *cleavage.*
Coalescence	ko-a-les'-ens		n	✓	✓	✓	✓	✓	The structural union of like parts, as the coalescence of the roots of a tooth.
Coffer-dam	koff'-er-dam		n	✓	o	2	o	o	Rubber-dam; the thin sheets of caoutchouc used to prevent the access of saliva to the field of dental operations.
Comminuted	kom'-mi-nu-ted		a	✓	✓	✓	✓	✓	Broken into pieces by the action of physical forces.
Complex Crown	. . . . .								A tooth crown composed of two cones (as the bicuspids), or of three or more (as the molars).—*Thompson.*
Component	kom-po'-nent		n	✓	✓	o	o	✓	A constituent element or part.
Compressed	kom-prest'		p-a	✓	✓	o	✓	✓	Pressed together or into smaller compass; flattened laterally; reduced in breadth.
Condensation	kon-den-sa'-shun		n	✓	✓	✓	✓	✓	The act or process of making dense, as the *condensation* of gold in filling teeth.
Cone	kone		n	✓	o	o	✓	✓	The mechanical element of the tooth crown.—*Marsh.*
Congenital	kon-jen'-i-tal		a	✓	✓	✓	✓	✓	Existing at birth.—*Gould.* Born with one.—*Standard.*
Conservative	kon-serv'-a-tiv		a	✓	✓	✓	o	✓	Tending to preserve; preservative. Used to indicate operations intended to preserve tooth substance, and teeth; also, the life of the pulp.
Constant	kon'-stant		n	✓	✓	o	✓	✓	That which is permanent or invariable.
Constricted	kon-strik'-ted		p-a	✓	o	o	o	✓	Contracted at a particular point or points.
Contact Point	. . . . .		n						A point on the surface of a tooth which touches a neighboring tooth.—*Black.*
Contour	kon-toor'	✓	v	✓					To make a contour or outline of. To restore by a filling the original outline of a decayed tooth.—*Guilford.*

Contour	kon-toor′		n	1	o	×	o	1	The line bounding a figure or body, as the *contour* of a tooth.
Contour	kon′-toor		n	2	o	o	o	2	
Contouring	kon-toor′-ing		n	×	o	o	o	×	The restoration of lost forms.
Coronal	kor′-o-nal		a	×	o	×	×	×	Of or pertaining to a crown. Applied by some to the occlusal surfaces of teeth.
Coronoid	kor′-o-noid		a	×	×	×	×	×	Having a crown-like form.
Corrosion	kor-ro′-zhon		n	×	×	×	×	×	Gradual decay by crumbling or surface disintegration.
Remarks.—Sometimes (erroneously) used for erosion or abrasion.									
Crests			n	×	×	×	×	×	The sinuous cusps or enamel ridges on the grinding face of the molars of herbivora.—*Cope.*
Crown			n	×	×	o	o	×	That portion of the tooth which is exposed above the gum and is covered with enamel.—*Black.*
Crown			v	o	o	o	o	o	To place an artificial tooth-crown upon a natural tooth or root.—*Guilford.*
Crucial	kru′-shi-al		a	×	×	×	×	×	Having the form of a cross.
Crusta Petrosa	krus′-ta pe-tro′-sa		n	o	×	×	o	×	The cementum of the teeth.
Cusp	kusp		n	×	o	×	×	×	A sharp eminence on the occlusal surface of a tooth crown.
Cuspid	kusp′-id		n	o	o	o	o	×	A tooth with one point or cusp,—the canine.—*Black.*
Cuspidate	kus′-pi-date		a	×	o	o	o	×	Formed of or like one or more cusps.—*Owen.*
Cutting Edge			n						That surface of the crown of an incisor tooth which presents toward the opposite jaw.—*Guilford.*
Decalcification	de-kal′-si-fi-ka′-shun		n	×	×	×	o	×	The removal of the calcareous constituents of the teeth.
Decalcify	de-cal′-si-fy		v. t	×	·	×	×	o	To remove lime-salts from tissues impregnated with them.
Decay	de-cay′		n	×	×	×	o	o	The gradual loss of a structure or function; putrefactive decomposition; vulgar term for dental caries.
Deciduous	de-sid′-u-us	×	a	×	×	×	o	×	Liable to be shed at periodical or certain stages of growth; as antlers, hair, teeth. Applied to the twenty teeth of childhood, which are replaced by others of the permanent set.
Deciduus	de-sid′-u-us		a	o	o	o	×	o	Same as deciduous.
Deflect	de-flekt′		v	×	o	o	o	×	To cause to turn aside.
Degeneracy	de-jen′-e-ra-see		n	×	×	•	o	×	(1) The state of being degenerate; condition of having grown worse. (2) The act or process of degenerating.
Dens Sapientiæ	dens sa-pi-en′-shea		n	×	×	o	·	×	The third molar; the wisdom-tooth.
Dental	den′-tal		a	×	×	×	×	×	Referring or pertaining to the teeth.
Dentalgia	den-tal′-je-a		n	o	o	×	o	o	Toothache.
Denterocone	den′-ter-o-kone		n	o	o	o	o	o	The antero-internal cone of the upper premolar.—*Scott.*
Denteroconid	den-ter-o-kon′-id		n	o	o	o	o	o	The antero-internal cone of the lower premolar.—*Scott.*
Denticles	den′-ti-kls		n	×	o	o	o	×	Shapeless calcareous bodies which serve the purposes of teeth.—*Owen.*
Denticulate	den-tik′u-late		a	×	×	×	×	×	Furnished with small teeth.
Dentigerous	den-tij′-e-rus		a	×	×	×	×	×	Bearing or supporting teeth; supplied with teeth; also containing teeth, as a dentigerous cyst.
Dentin	den′-tin	×	n	1	o	o	2	1	The calcified substance that forms the main portion of the teeth.
Dentine	den′-teen		n	2	×	×	1	2	Same as dentin.
Dentinal	den′-ti-nal		a	×	×	o	×	×	Referring to the dentin.

WORD.	PRONUNCIATION.	Committee's Preference.	Part of Speech.	Century.	Dunglison.	Gould.	Thomas.	Standard.	DEFINITION.
Dentinification	den-tin′-i-fi-ka′-shun		n	o	✓	o	o	o	The formation of the dentin of the teeth.
Dentinoid	den′-tin-oid		a	o	✓	o	o	·	Having the form of a tooth.
Dentiscalpium	den-tis-kal′-pi-um		n	o	✓	o	✓	o	An instrument employed for the removal of salivary calculus, and for scraping the teeth. (*Obsolete.*)
Dentist	den′-tist		n	✓	✓	o	✓	✓	A specialist who treats diseased teeth and restores lost teeth by means of artificial substitutes.
Dentition	den-tish′-un		n	✓	✓	✓	✓	✓	The eruption of the teeth.
Denture	den′-ture		n	✓	✓	✓	o	✓	The provision of teeth in the jaws. Specifically, in dentistry, a single set of artificial teeth. *Full Denture*, a double set of artificial teeth, one for each jaw.
Denuded	de-nu′-ded		a	✓	o	o	o	✓	Stripped of its covering, as a tooth *denuded* of its enamel.
Desiccation	des-i-ka′-shun		n	✓	✓	✓	✓	✓	The process of drying or evaporating, as *desiccation* of a cavity.
Developmental Grooves	de-vel-op-men′-tal		n	✓	o	o	✓	✓	Fine depressed lines in the enamel which mark the junction of the primitive lobes.—*Black.*
Devitalize	de-vi′-tal-ize		v.t	✓	✓	✓	o	✓	To deprive of vitality. Specifically, to destroy the life of the dental pulp.
Diastema	di-as-te′-ma		n	✓	✓	✓	✓	✓	A space between the teeth, especially the space between the upper lateral and canine, into which the lower canine closes. —*Owen.*
Diphyodont	dif′-i-o-dont		n	✓	o	o	o	✓	An animal having two sets of teeth, both the deciduous and the permanent.—*Owen*
Discoid	dis′-koid		a–n	✓	✓	1	1	✓	*a.* Like a disc; *n.* an excavator having a blade in the form of a disc.
Distal	dis′-tal		a	✓	o	✓	o	✓	Away from the median line of the face (following the curve of the dental arch).—*Black.*
Distal Angles			n	o	o	o	o	o	The angles formed by the junction of the other surfaces of the crown with the distal surface.—*Black.*
Disto-buccal	dis-to-buk′-kal		a	o	o	o	o	o	Pertaining to the distal and buccal walls of the bicuspid and molar teeth.
Disto-labial	dis′-to-la′-bi-al		a	o	o	o	o	o	Pertaining to the portions of the anterior teeth between their distal and labial walls.
Disto-lingual	dis′-to-lin′-gwal		a	o	o	o	o	o	Pertaining to the portions of teeth between their distal and lingual walls.
Docoglossa	dok-o-glos′-sa		pl.n	✓	o	o	o	✓	Plate or chevron-formed teeth of molluscs.—*Tryon.*
Dolicocephalic	dol-i-ko-se-fal′-ik	✓	a	o	1	1	✓	✓	Having a long skull, the breadth being less than 75 per cent. of its length.
Dolicocephalic	dol′-i-ko-sef′-a-lik		a	✓	2	2	o	o	
Dovetailed	duv′-taild		a	✓	✓	o	o	✓	In the form of a dovetail joint or mortise. Applied to cavities in the teeth.
Drill	dril		n	✓	✓	✓	o	✓	A cutting tool for boring holes (cutting only forward).

Ectodermic	ek′-to-der′-mik	a	×	o	o	o	×	Applied to structures derived from the upper epithelial layers of the derm, as hair, chitin, enamel, etc.—*Huxley.*
Edentulous	e-den′-tu-lus	a	×	×	×	×	×	Without teeth. The dental arches devoid of teeth.
Elastic Hinge		n						A device found in fishes and reptiles, by which the teeth can be pushed over and then sprung back to hold prey.—*Owen.*
Enamel	en-am′-el	n	×	×	×	×	×	The calcified epithelial tissue covering the crowns of teeth.—*Black.*
Endodermic	en-do-der′-mik	a	×	o	o	o	o	Applied to structures derived from the lower layers of the derm, as dentin.—*Huxley.*
Entoconid	en-to-kon′-id	n	o	o	o	o	o	Inner cusp of the posterior heel or talon of the lower molars.—*Osborn.*
Epithelium	ep-i-the′-li-um	n	×	×	×	×	×	The superficial layer of cells of mucous membranes. A very delicate membrane forming the outer covering of the corium or true mucous membrane, and which enters into the structure of glandular organs.
Erosion	e-ro′-zhon	n	×	×	×	×	×	1. The act of wearing away. 2. Corrosion; ulceration. The gradual destruction of a part by the action of a corrosive substance. A disease of the teeth characterized by a polished or smooth surface.
Erosive	e-ro′-siv	a	×	×	×	o	o	Pertaining to tissue loss by erosion.
Erupt	e-rupt′	v	×	o	×	×	o	To burst forth, as a tooth through the gums.
Eruption	e-rup′-shun	n	×	×	×	×	×	The emergence of an organ, as a tooth; a bursting forth of any kind.
Exostosis	ex-os-to′-sis	n	×	×	×	×	×	A localized hypertrophy of bone; in dentistry frequently used as a synonym of hypercementosis.
Expansion	eks-pan′-shun	n	×	×	o	×	×	The act of expanding in any sense; increase in amount or size.
Extractor	eks-trakt′-or	n	×	×	×	o	×	An instrument or broach for removing the pulp of a tooth.
Extrude	eks-trood′	v	×	o	o	o	×	To force, push, or thrust out; drive out or away; expel.
Extrusion	eks-troo′-zhun	n	×	o	o	o	×	The act or process of extruding; expulsion. (Projecting from a socket.)—*Com.*
Eye-tooth	eye′-tooth	n	×	×	×	o	/	The superior cuspid (canine) of the human denture. (*Colloquial.*)
Face	fase	n	×	×	×	×	×	That portion of a burnisher or condensing instrument upon which its use depends, as the *face* of a hammer.—*Weeks.*
Fang	fang	n	×	×	×	×	×	The root of a tooth. (*Obsolete.*)
Ferrule	fer′-il	n	×	×	×	×	o	A metal ring or cap on the end of a cane or tool; a bushing or thimble.
Festoon *Remarks.*—Fes-toon′ in Standard.	fes′-toon	n.v.	×	×	×	o	o	*n.*, The labial and buccal aspects of the gums immediately above the necks of the teeth; *v.*, the act of forming the artificial gums of dentures to such shape.
Fibrous Membrane		n	o	o	o	o	o	The membrane which carries the teeth of sharks and rays.—*Owen.*
Filling	fill′ ing	v-n	×	×	×	o	o	*v.*, The process of plugging cavities in the crowns or roots of teeth; *n.*, the completed plug.
Fissure	fish′-ur	n	×	×	×	×	×	A fault in the enamel caused by the imperfect joining of the enamel of the lobes (as in the grooves on the occlusal surfaces of bicuspids and molars).—*Black.*

Word.	Pronunciation.	Committee's Preference.	Part of Speech.	Century.	Dunglison.	Gould.	Thomas.	Standard.	Definition.
Foramen	for-a′-men		n	×	×	×	×	×	A passage perforating tissues (usually bone) and transmitting vessels or nerves; *e.g.*, the apical foramen of the root of a tooth.
Foramina	for-am′-i-na		pl.n	×	×	×	×	o	Plural of foramen.
Force	fors		n	×	×	×	×	×	Power; energy.
Forceps	for′-seps		n	×	×	×	×	×	An instrument having two jaws and handles, designed for the extraction of teeth.
Fossa (pl. Fossæ)	fos′-sa		n	×	×	×	×	×	A round or angular, shallow depression in the occlusal surfaces of bicuspids and molars, and the lingual surface of incisors and canines.—*Black.*
Fracture	frak′-tshur		v–n	×	×	×	×	×	*v.*, To break; *n.*, a break.
Frontal	fron′-tal		a	×	×	o	×	×	Belonging or relating to the forehead; as, the frontal bone of the skull.
Gage	gaje	×	n	1	o	o	o	1	Same as gauge.
Gangrenous	gang′-gre-nus		a	×	×	×	o	×	Mortified; relating to or of the nature of gangrene or mortification.
Gauge	gaje		n	2	o	o	o	2	An instrument for measuring or indicating capacity, quantity, dimensions, etc.; hence, a standard of comparison or measurement.
Gemination	jem-i-na′-shun		n	×	×	o	o	×	Duplication.
Geminous	jem′-i-nus		a	×	o	×	o	o	Applied to the formation of twin teeth in a common sac,—the follicles containing twin germs.
Gingivæ	jin-ji′-vay		pl.n	o	o	×	×	o	The gums at the necks of the teeth.—*Black.*
Gingival	jin-ji′-val	×	a	×	o	o	o	×	Of or pertaining to the gums; applied to the portion of a tooth that is embraced by the gum margin.
Gingival	jin′-jiv-al		a	o	×	×	×	o	
Gingivally	jin-ji′-val-ly		adv	o	o	o	o	o	Toward the gums.
Ginglymoid	jin′-gli-moid		a	×	×	×	×	×	Hinged, as the jaw articulation of the carnivora.—*Ryder.*
Gluten	glu′-ten		n	×	×	×	×	×	The organic basis of bone, dentin, etc.—*Frey.*
Gomphosis	gom-fo′-sis		n	×	×	×	×	×	Attachment of the teeth by implantation in a bony socket or alveolus.
Gothic (Arch)	goth′-ik		a	×	o	o	o	×	Of or pertaining to the pointed types of mediæval architecture, as, *Gothic* arch. Applied to teeth arranged in a Gothic arch.
Green-stain	green′-stain		n	o	o	o	o	o	Fungoid deposits upon the enamel surfaces of the teeth, most commonly at their cervico-labial portions.
Groove	gruve		n	×	×	×	×	×	A line or long narrow depression in the enamel.—*Black.*
Gum	gum		n	×	×	×	×	×	The fibro-mucous structure overlying the alveolar processes of the maxillary bones.
Gum-boil	gum′-boil′		n	×	×	×	×	×	Alveolo-dental abscess. (*Colloquial and obsolete.*)
Gum-margin	gum′-mar-gin		n	o	o	o	o	o	The edge of the gum next to the necks of the teeth.
Haplodont	hap′-lo-dont		a	×	o	o	o	×	Having undivided or simple tooth crowns.—*Cope.*

Heredity	he-red′-i-te	n	×	o	×	×	×	**Transmission of physical or mental peculiarities, qualities, diseases, etc., from parent to offspring.**
Homogeneity	ho′ mo-je-ne′-e-te	n	×	×	×	×	×	**Identity or similarity of composition and character.**
Horn	horn	n	×	×	×	o	×	**A term applied to the coronal extremities or cornua of the dental pulp.**
Hypercementosis	hy-per-se-men-to′-sis	n	o	o	o	o	o	**Exostosis of the cementum of the teeth; an hypertrophy of the cementum.**
Hypersensitive	hy-per-sen′-si-tiv	a	×	o	o	o	o	Abnormally sensitive.
Hypertrophy	hy-per′-tro-fee	n	×	×	×	×	×	**The undue or excessive growth or development of an organ or part; the morbid enlargement of a part; opposed to atrophy.**
Hypo-cone	hi′-po-kone	n	o	o	o	o	×	**The postero-distal cone of the upper molars.—*Osborn.***
Hypoconid	hi-po-kon′-id	n	o	o	o	o	×	**The postero-buccal cone (disto-buccal cusp) of the lower molars.—*Osborn.***
Hypoconulid	hi-po-kon′-u-lid	n	o	o	o	o	o	**The distal cusp—the fifth tubercle—of the lower molar.—*Osborn.***
Impinge	im-pinj′	v	×	o	o	o	×	To touch upon; strike; hit.—*Webster.*
Implantation	im-plan-ta′-shun	n	×	×	×	o	×	**The operation of forming an artificial alveolus, in which a natural tooth is inserted.**
Incisal	in-size′-al	a	o	o	o	o	o	Applied to the cutting edge of incisors and cuspids.—*Black.*
Incisal Angles	in-size′-al	n	o	o	o	o	o	**The angles of the various lateral surfaces of the tooth crowns where they join the incisal surface.—*Black.***
Incisive	in-size′-iv	a	×	×	×	o	×	**Pertaining to the incisors or their surroundings; as, *incisive fossa.***
Incisor	in-size′-or	n	×	×	o	×	×	**A tooth** with a cutting edge, from *incido*, to cut. **The anterior teeth above located in the intermaxillary bones (whatever their shape) and their opponents below in the anterior portion of the lower jaw.**—*Black.*
Inclination	in-kli-na′-shun	n	×	o	o	×	×	The deviation of long axis of tooth from the vertical; **as, "*mesial inclination*," "*distal inclination*," "*lingual inclination.*"**
Inferior	in-fe′-ri-ur	a	×	×	×	×	×	Below; beneath. Applied to the teeth of the lower jaw.
Inframaxillary	in-fra-max′-il-la-ry	a	×	×	×	2	×	Beneath or under the jaw.
Inlay	in′-lay	n	×	o	o	o	×	That which is inserted or inlaid. A term used by some to designate any filling occupying but one surface of a tooth. More properly applied to fillings first made and then inserted into a cavity with cement.—*Guilford.*
Interdental	in-ter-den′-tal	a	×	×	×	o	×	Between the teeth. Applied to any spaces between the teeth.
Interdigitation	in-ter-dij-i-ta′-shun	n	×	×	×	o	×	The method by which non-cohesive metals are mechanically united in fillings.
Intermediate	in-ter-me′-di-ate	n	×	×	×	×	×	A non-conducting material placed under a metallic filling over the axial or basal wall.—*Weeks.*
Intermittent	in-ter-mit′-ent	a	×	×	×	×	×	Having periods of intermission; interrupting; ceasing at intervals.
Interproximal	in-ter-prox′-i-mal	a	o	o	o	o	o	Between adjoining surfaces.
Interproximate Space	in′-ter-prox′-i-mate	n	o	o	o	o	o	**The V-shaped space bounded by the proximate surfaces of the teeth and the alveolar septum, which is filled by the gum.—*Black.***
Interzonal	in′-ter-zo′-nal	a	o	o	o	o	o	**Situated between two zones or bands. Suggested as a term to indicate the line between enamel and dentin, at the periphery of the dentin.**

Word.	Pronunciation.	Committee's Preference.	Part of Speech.	Century.	Dunglison.	Gould.	Thomas.	Standard.	Definition.
Isognathous	i-sog'-na-thus		a	×	o	o	o	✓	Having lower jaw of nearly the same width as upper jaw.—*Ryder.*
Jaw	jaw		n	×	×	×	×	×	A maxilla or mandible.
Jumble	jum'-bl		v	×	o	o	o	·	To mix in a confused mass; to put or throw together without order.—*Webster.*
Kreatin or Creatin	kre'-a-tin		n	×	×	×	×	×	The organic, epithelial basis of horn, hair, enamel, etc.—*Frey.*
Labial	la'-bi-al		a	×	×	×	×	×	Pertaining to, or toward the lips —*Black.*
Labial Angles			n	o	o	o	o	o	The angles of the labial surface which join the other surfaces of the tooth crown.—*Black.*
Labial Surface			n	o	o	o	o	o	The surface of a tooth crown which is toward the lips.—*Black.*
Labialis	la-bi-a'-lis		n	o	×	o	o	o	The orbicularis oris muscle.
Labially	la'-bi-al-ly		adv	×	o	o	o	×	Toward the lips.—*Black.*
Labials	la'-bi-als		n	×	×	×	o	×	Letters representing sounds which are mainly formed by the lips.
Labiate	la'-bi-ate		a	×	o	×	×	o	Having lips.
Labio-dental	la'-bi-o-den'-tal		a	×	×	×	o	×	Pertaining to the lips and teeth.
Lateral (incisor)	lat'-e-ral		n	×	×	×	o	×	The second incisor from the median line.
Lenticular Jaws	len-tik'-u-lar		n	×	×	×	×	×	The serrated maxillæ of the leech and other worms.—*Huxley.*
Lever	lev'-er	×	n	1	2	o	o	1	A bar of metal, wood, or other substance used to exert pressure or sustain a weight at one point of its length by receiving a force or power on a second and turning at a third on a fixed point called a fulcrum. Three kinds according to position of fulcrum.
Lever	le'-ver		n	2	1	o	o	2	
Ligature	lig'-a-ture		n	×	×	×	×	×	Anything that binds; a cord or thread for tying blood-vessels (*Web.*) or for tying the teeth together.—*Com.*
Lingual	ling'-gwal		a	×	×	×	×	×	Situated near or toward the tongue, as the *lingual* surface of a tooth.
Lingual Surface			n	o	o	o	o	o	That surface of the tooth crown which is next to the tongue.—*Black.*
Lingualis	ling-gwa'-lis		n	×	×	×	o	×	A long, small muscle, passing from the root to the tip of the tongue.
Lingually	lin'-gwal-ly		adv	×	o	o	o	×	Toward the tongue.—*Black.*
Lobe	lobe		n	×	×	×	×	×	A division of a tooth-crown formed from a distinct point of calcification.—*Black.*
Longitudinal	lon-ji-tu'-di-nal		a	×	×	×	×	×	Pertaining to length, as *longitudinal* sections of the teeth.
Lophodont	lof'-o-dont		n	×	o	o	o	o	Summit of tooth crown thrown into transverse or longitudinal folds.—*Cope.*
Luxation	lux-a'-shun		n	×	×	×	×	×	Dislocation; the forcible displacement of a part from its normal position.
Macrodont	mak'-ro-dont		a	×	o	×	o	×	Having large teeth.

Macroscopic	**mak-ro-skop'-ik**		a	×	×	×	o	×	Visible to the naked eye; opposed to microscopic.
Malleable	**mal'-e-a-bl**		a	×	×	×	o	×	Capable of being hammered or rolled out without breaking or cracking.
Malocclusion	**mal-ok-klu'-zhun**		n	o	o	o	o	o	The occlusion of the teeth in positions not in accordance with anatomical rule.
Mandible	**man'-di-bl**		n	o	o	o	o	o	The lower jaw.
Manipulation	**man-ip-u-la'-shun**		n	×	×	×	×	×	Skillful use of the hands.
Margin	**mar'-jin**		n	×	o	o	×	×	The border or bounding line of any surface of a tooth or cavity.
Marginal Ridges	**mar'-jin-al**		n	×	o	o	×	×	The ridges or elevations of enamel on the outer margins of the occlusal surfaces of the bicuspids and molars.—*Black.*
Mastication	**mas-ti-ka'-shun**		n	×	×	×	×	×	The process of comminuting the food with the teeth; synchronous with insalivation.
Matrices	**mat'-ri'-seez**		n	×	o	o	o	×	Plural of matrix.
Matrix	**ma'-triks**	×	n	1	o	×	×	1	A mold in which anything is cast or shaped. Specifically, in dentistry, a properly shaped piece of metal, wood, or other substance used to support and shape the filling during its introduction.—*Guilford.*
Matrix	**mat'-riks**			2	×	o	o	2	
Maxilla	**mak-sil'-a**		n	×	×	×	×	×	A jaw or jaw-bone.
Maxillæ	**mak-sil'-lae**		pl.n	×	×	×	×	×	The upper jaw-bones.
Maxillary	**mak'-si-la-re**		a	×	×	×	×	×	Of or pertaining to a jaw or jaw-bone.
Median	**me'-di-an**		a	×	×	×	×	×	Middle; as the median line of the body.
Mesial	**mes'-i-al**	×	a	1	o	×	o	1	Toward the median line of the face (following the curve of the dental arch).
Mesial	**me'-zi-al**			2	×	o	×	2	
Mesial Angles			n	o	o	o	o	o	The angles at the junction of the mesial surfaces with the other surfaces of the crown.—*Black.*
Mesio-buccal	**me'-se-o-buk'-kal**		a	o	o	o	o	o	Relating to surfaces between the mesial and buccal aspects of the teeth.
Mesio-distal	**me'-se-o-dis'-tal**		a	o	o	o	o	o	From the mesial to the distal aspect.
Mesio-lingual	**me'-se-o-lin'-gwal**		a	o	o	o	o	o	Pertaining to surfaces between the mesial and lingual aspects of the teeth.
Mesio-lingual groove			n	o	o	o	o	o	A developmental groove running over the junction of the fifth cusp, or cingule, on upper molars.—*Black.*
Mesocephalic	**mes-o-se-fal'-ik**	×	a	1	o	2	o	1	A term applied to a skull having a capacity between 135 and 145 c.c.—*Gould.*
Mesocephalic	**mes-o-sef'-a-lik**		a	2	o	1	o	o	
Mesodont	**mes'-o-dont**		a	×	o	×	o	×	Having medium-sized teeth.
Mesognathous	**me-sog'-na-thus**		a	×	o	o	o	×	Having a moderate or intermediate gnathic index of from 98 to 103, as a skull.—*Cent.*
Metacone	**met'-a-kone**		n	o	o	o	o	×	The disto-buccal cone (or cusp) of the upper molar.—*Osborn.*
Metaconid	**met'-a-kon'-id**		n	o	o	o	o	×	The mesio-lingual cone (or cusp) of the lower molars.—*Osborn.*
Metallurgy	**met'-al-ur-ji**		n	×	o	o	×	×	Study of the properties and characteristics of metals, also the art of extracting metals from their ores.
Microdont	**my'-kro-dont**		a	×	o	×	o	×	Applied to small-toothed races.—*Flower.*
Microscopic	**my-kro-scop'-ic**		a	×	×	×	×	×	1. Pertaining to the microscope or microscopy. 2. Exceedingly minute.
Model	**mod'-el**		n	×	×	×	×	×	An object representing accurately something to be made or already existing; a material pattern.
Remarks.—Preferred to cast. One pours a cast and casts a model.									

Word.	Pronunciation.	Committee's Preference.	Part of Speech.	Century.	Dunglison.	Gould.	Thomas.	Standard.	Definition.
Odontophore	o-don′-to-fore		n	×	o	o	o	×	The strap-like organ of molluscs which carries the teeth.—*Tryon.*
Odontophyia	o-don-to-fy′-i-a		n	o	×	×	o	o	Dentition.
Odontoplerosis	o-don-to-ple-ro′-sis		n	o	×	×	o	o	Filling teeth.
Odontoprisis	o-don-to-pri′-sis		n	o	×	×	×	o	Stridor dentium, or grinding of the teeth.
Odontorrhagia	o-don-tor-rha′-gia		n	o	o	×	o	o	Hemorrhage from the socket of a tooth.
Odontosersis	o-don-to-ser′-sis		n	o	×	×	×	o	Looseness of the teeth arising from partial or total destruction of the alveolar processes, caused most frequently by diseases of the gums.
Odontosis	o-don-to′-sis		n	o	×	×	×	o	The formation, growth, or development of a tooth. Dentition.
Odontosmegma	o-don-tos-meg′-ma		n	o	×	×	o	o ×	Anything employed for cleaning teeth; a tooth-powder or a tooth-brush.
Odontosteresis	o-don-to-ste-re′-sis		n	o	×	×	o	o	Loss of the teeth.
Odontosynerismus	o-don-to-syn-e-ris′-mus		n	o	×	×	o	o	Chattering of the teeth.
Odontotechny	o-don-to-tek′-ny		n	o	×	o	o	o	Dental surgery.
Odontotherapia	o-don-to-ther′-a-pi-a		n	o	×	×	×	o	Dental therapeutics; the treatment or care of the teeth.
Odontotripsis	o-don-to-trip′-sis		n	o	×	×	×	×	The gradual loss of substance of the coronal extremities of the teeth from attrition.
Odontrypy	o-don′-tri-pee		n	×	×	o	o	×	The perforation of a tooth for the purpose of affording egress to purulent matter confined in the pulp-cavity.
Orifice	or′-i-fis		n	×	×	×	×	×	An opening from or to a cavity.
Orthodontia	or′-tho-don′-shea		n	o	×	o	o	×	The correction of irregularities of the teeth.—*Gould.*
Orthognathism	or-thog′-na-thizm		n	×	o	o	o	×	Having jaws with little or no forward projection.—*Gould.*
Orthognathous	or-thog′-na-thus		a	×	×	o	×	×	Having perpendicular facial lines, *i.e.*, near 80°; as, the European races.—*Blumenbach.*
Osteitis	os-te-i′-tis		n	×	×	×	×	×	Inflammation of bones.
Osteoblast	os′-te-o-blast		n	×	×	×	×	×	One of the formative cells of bone tissue.
Osteoclast	os′-te-o-klast		n	×	×	×	o	×	One of the large (giant) cells concerned in the removal of bone.—*Gould.*
Paracone	par′-a-kone		n	o	o	o	o	×	The mesio-buccal cone (or cusp) of the upper molar.—*Osborn.*
Pericemental	per-i-se-men′-tal		a	o	o	o	o	o	Pertaining to the pericementum; as, *pericemental* membrane.
Pericementitis	per-i-se-men-ti′-tis		n	o	×	×	o	o	Inflammation of the peridental membrane.
Pericementum	per′-i-se-men′-tum		n	o	×	×	o	o	The membrane surrounding and attached to the root of a tooth.
Peridental	per-i-den′-tal		a	×	o	×	o	o	Applied (1)to the enamel cuticle of the tooth; (2) to the membrane surrounding the root.
Peridenteum	per-i-den′-te-um		n	o	o	×	o	o	The periosteum.
Periodontitis	per-i-o-don-ti′-tis		n	×	×	×	×	×	Inflammation around a tooth; a synonym of pericementitis, which latter is more explicit.

Periosteum	per-i-os′-te-um		n					×	**The fibro-vascular membrane that invests and nourishes the bone. Sometimes applied to the investing membrane of a tooth.**
Periostitis	per-i-os-ti′-tis		n	×	×	×	×	×	**Inflammation of the nutritive membrane overlying the external surfaces of bones.**
Peripheral	per-if′-er-al		a	×	×	×	×	×	**Distant from the center; distal; as a *peripheral* element of the skeleton.**
Periphery	per-if′-er-ee		n	×	×	×	×	×	**The outer surface.**
Permanent Teeth									**Those teeth which appear in childhood and remain as the teeth of adult age.—*Black.***
Pit			n	×	×	×	×	×	**A sharp-pointed depression in the enamel of a tooth.—*Black.***
Pleural	plu′-ral		a	×	×	o	×	×	**Pertaining to a pleuron or lateral part. Applied to the lateral rows of teeth on the odontophore.—*Tryon.***
Pleurodont	plu′-ro-dont		a	×	o	o	o	×	**Having teeth attached by anchylosis to the sides of the dental groove, as in some reptiles.—*Huxley.***
Pocket	pock′-et		n	×	o	×	o	×	**An open cavity having a large mouth, the walls formed, at least in part, of soft tissues; as spaces between the gums and teeth.**
Premolars	pre′-mo-lars		n	×	×	×	×	×	**The succedaneous grinders between the canines and true molars (called bicuspids in man).—*Black.***
Process	pros′-ess		n	o	×	o	o	×	**A protuberance from the surface of a bone, serving as the attachment of muscle or ligament; as, *alveolar process.***
Prognathism	prog′-na-thizm		n	×	o	o	o	×	**The quality of having a projecting lower jaw.—*Gould.***
Prognathous	prog′-na-thus	×	a	1	1	2	×	×	**Having a projecting lower jaw, and a facial angle below 75°.—*Gould.***
Prognathous	prog-na′-thus		a	2	2	1	o	o	
Prosthesis	pros′-the-sis	×	n	×	×	×	×	×	**The making of artificial parts and fitting them to the body, as false teeth, cork leg, etc.**
***Remarks.*—From *pros*, to, + *tithemi*, to place.**									
Prosthetic	pros-thet′-ik	×	a	×	×	×	o	×	**Of or pertaining to prosthesis.**
Prothesis	proth′-e-sis		n	×	×	×	×	×	**Same as prosthesis.**
***Remarks.*—From *pro*, before + *tithemi*, to put.**									
Prothetic	pro-thet′-ik		a	×	×	×	o	×	**Of or pertaining to prothesis; placed before; prefixed.**
Protocone	pro′-to-kone		n	o	o	o	o	×	**1. The primitive reptilian cone of an upper molar tooth, the antero-lingual.—*Osborn.* 2. The antero-external cone of an upper bicuspid or premolar.—*Scott.***
Protoconid	pro-to-kon′-id		n	o	o	o	o	×	**1. The mesio-buccal cone (or cusp) of a lower molar tooth.—*Osborn.* 2. The antero-buccal cone of a lower premolar.—*Scott.***
Protrusion	pro-tru′-zhun		n	×	×	o	o	×	**The act of thrusting forward, or the state of being protruded.—*Webster.***
Proximal	proks′-i-mal	×	a	×	×	×	×	×	**Relatively nearer the central portion of the body or point of attachment. (See *Proximate.*)**
Proximate	proks′-i-mat		a	×	×	×	×	×	**Lying or being in immediate relation with something else; next. Applied to a surface of a tooth (either distal or mesial) which is next to another tooth.—*Black.***
***Remarks.*—*Proximal* would seem to be preferable, as its termination harmonizes with *mesial*, *distal*, *incisal*, etc.**									

Word.	Pronunciation.	Committee's Preference.	Part of Speech.	Century.	Dunglison.	Gould.	Thomas.	Standard.	Definition.
Proximate Contact			n	×	o	×	×	×	The touching of the surfaces of the teeth.—*Black.*
Proximation	proks-i-ma'-shun		n	o	o	o	o	×	The near approach of the proximate surfaces of the teeth.—*Black.*
Ptenoglossa	ten-o-glos'-a		pl.n	×	o	o	o	×	A group of gastropods having teeth only on the sides of the odontophore, but no middle row.—*Tryon.*
Ptychodont	ti'-ko-dont		a	×	o	o	o	×	Tooth crowns folded on the sides.—*Cope.*
Pulp			n	×	×	×	×	×	The soft tissue of vessels and nerves which fills the pulp-chamber and root-canals of a tooth; the remnant of the formative pulp.—*Black.*
Pulpal	pulp'-al		a	o	o	o	o	o	Pertaining to the pulp.
Pulp-canal	pulp-ca-nal'		n	o	o	o	o	o	That portion of the pulp-cavity traversing the roots of teeth from the apical foramina to the bottom of the pulp-chamber.
Pulp-cavity	pulp-cav'-i-ty		n	×	o	o	o	×	That portion of the interior of a tooth occupied by the body of the pulp.
Pulp-chamber			n						The central chamber in the crown of a tooth, containing the body of the pulp.
Pulpitis	pulp-i'-tis		n	o	×	×	o	o	Inflammation of the dental pulp.
Pulp-nodule		×	n	o	o	o	o	o	An irregular mass of dentin, either attached or free, found in the pulp-cavity.
Pulp-stones	pulp-stones'		pl.n	o	o	o	o	o	Pulp-nodules.
Pulp-tissue	pulp-tis'-su		n	o	o	o	o	o	The histological elements of which the dental pulp is composed.
Putrescent	pu-tres'-sent		a	×	×	×	o	×	In process of putrefactive decomposition.
Pyorrhea	py-or-rhe'-a		n	1	o	×	o	1	A flow of pus; *pyorrhea alveolaris*, a flow of pus from the alveoli.
Pyorrhœa	py-or-rhe'-a		n	2	×	o	o	2	
Quadri-tubercular	quad-ri-tu-ber'-cu-lar		a	×	o	o	o	×	Having four tubercles. Applied to molar teeth.
Quinque-tubercular	quin-que-tu-ber'-cu-lar		a	×	o	o	o	×	Having five tubercles. Applied to molar teeth.
Rachidian	ra-kid'-i-an		a	×	×	o	o	×	Pertaining to the rachis or axis. Applied to the central rows of teeth on the odontophore.—*Tryon.*
Radula	rad'-u-la		n	×	×	o	o	×	The dentary organ of molluscs.—*Tryon.*
Raphidio-glossa			n	o	o	o	o	o	Needle-shaped teeth on odontophore.—*Tryon.*
Reamer	re'-mer		n	×	×	×	o	×	An instrument for enlarging holes. Usually a smooth five-sided tapering steel instrument.
Recession	re-ces'-shun		n	×	o	o	o	×	The gradual drawing away of a part from its normal position, as the recession of the gums from the necks of the teeth.
Replantation	re-plan-ta'-shun		n	×	o	×	o	×	The operation of replacing a tooth in the alveolus from which it has been extracted.
Resorption	re-sorp'-shun		n	×	×	×	×	×	A loss of tissue-substance; deposits, bodies, or growths through the agency of exaggerated physiological processes.

Retainer	re-ta'-ner	n	×	o	o	o	×	An appliance for holding in position teeth which have been moved.—*Com.*
Retract	re-trakt'	v	×	o	o	o	×	To draw back.—*Webster.*
Retractor	re-trak'-tor	n	×	×	×	o	×	One who, or that which, retracts or draws back.—*Webster.*
Retroversion	re-tro-ver'-shun	n	×	×	×	×	×	The operation of turning backward.
Reversion	re-ver'-shun	n	×	o	×	×	×	The act of reverting or returning.—*Webster.* The appearance of characteristics which existed in remote ancestors.—*Gould.*
Ridge	rij	n	×	o	o	o	×	A long elevation on the surface of a tooth crown.—*Black.*
Root	rute	n	×	×	×	o	×	That portion of the tooth which is inserted in the alveolar process.—*Black.*
Root-canal		n						The canal in the center of the long axis of the root which contains the branches of the pulp.—*Black.*
Rotate	ro'-tate	v	×	o	o	×	×	To cause to revolve.—*Webster.* To turn or twist a tooth in its socket.—*Com.*
Rotation	ro-ta'-shun	n	×	×	×	×	×	The turning of a body about its axis, as the *rotation* of a tooth.
Rubber-dam	rub-ber-dam'	n	×	o	I	o	×	See Coffer-dam.
Rugæ	ru'-jee	pl.n	×	×	×	×	×	Folds or creases. Applied to the irregular ridges of the membrane of the roof of the mouth.—*Black.*
Saddle-arch	sad'-dle-arch	n	o	o	o	o	o	That form of dental vault the section of which represents the shape of a saddle.
Salivary	sal'-i-va-ry	a	×	×	×	×	×	Pertaining to the saliva, as calculus. A deposit of the calcium salts of the saliva is termed *salivary calculus.*
Scalpriform Incisors	scal'-pri-form	n	×	o	o	o	×	The cutting incisors of the rodents.—*Owen.*
Sectorial Teeth	sec-to'-ri-al	pl.n	×			o	×	The cutting teeth of the carnivora,—the long-bladed premolars and molars.—*Owen.*
Selenodont	se-len'-o-dont	a	×	o	o	o	×	Having longitudinal crescent-shaped ridges, as a molar tooth.
Septum	sep'-tum	n	×	×	o	×	×	A partition on the alveolar process which separates the alveoli.—*Black.*
Serumal	se-ru'-mal	a	o	×	o	o	×	Pertaining to the serum. Deposits of calcium salts from the blood-serum.
Sinus	si'-nus	n	×	×	×	×	×	A cavity or canal within bone, the interior of which is larger than the entrance or outlet.
Sixth-year Molar		n	o	o	o	o	o	The permanent first molar. (*Obsolete.*)
Socket	sock'-et	n	×	×	×	o	×	An opening or cavity into which anything is fitted; *tooth-socket*,—alveolus.
Stigma	stig'-ma	n	×	×	×	×	×	A brand; any mark of infamy.—*Webster.* A minute cicatrix. (In biology), a spot or mark.
Stomach-liths		n	o	o	o	o	o	The calcareous plates found in the stomach or gizzard of crustaceans, which carry cusped or molar-like eminences.
Stratum-granulosum	stra'-tum	n	×	×	o	o	o	This term has been used to indicate the dividing line between enamel and dentin—but no authority seems to exist for it.
Submarine	sub-ma-reen'	a-n	×	o	o	o	×	In dentistry, a term employed to designate situations and materials in the treatment and manipulation of which the parts are filled with the fluids of the mouth.
Succedaneous Teeth	suk-se-da'-ne-us	n	×	o	o	o	×	Those teeth of the permanent set which succeed or take the places of the temporary teeth.—*Black.*
Suction-plate	suk'-shun-plate	n	×	o	o	o	×	A plate so constructed as to be held in place by atmospheric pressure.

Word.	Pronunciation.	Committee's Preference.	Part of Speech.	Century.	Dunglison.	Gould.	Thomas.	Standard.	Definition.
Sulcate Groove	sul'-kate		n	×	×	×	×	×	A groove following the bottom of a sulcus.—*Black.*
Sulcus (Pl. sul'-si)	sul'-kus		n	×	×	×	×	×	A long narrow channel or furrow; a groove. Applied to narrow depressions and grooves on the surfaces of teeth.
Superincumbent	su-per-in-kum'-bent		a	×	o	o	o	×	Lying or resting on something else.—*Webster.*
Supernumerary	su-per-nu'-me-ra-ree		a	×	×	o	×	×	Having more than the usual or normal number.—*Gould.*
Swage	swaj		v	×	o	o	o	×	To shape by means of a swage.—*Webster.* To shape by pressing between a die and counter-die.—*Com.*
Symphysis	sim'-fi-sis		n	×	×	×	×	×	The coalescence or junction of bones, usually of symmetrical bones in the median line.—*Gould.*
Tænio-glossa	te'-ni-o-glos'-sa		pl.n	×	o	o	o	×	A kind of gastropod having bent teeth, as molluscs.—*Tryon.*
Talon	tal'-on		n	×	×	o	×	×	The posterior prominence or heel of the upper molar crown.—*Osborn.*
Talonid	tal'-on-id		n	o	o	o	o	o	The heel, or posterior portion, of the lower molar crown.—*Osborn.*
Tampon	tam'-pon		n	×	×	×	×	×	A plug of cotton, wool, or sponge, medicated or not, which is employed to plug a cavity, usually for the checking of hemorrhage.
Tartar	tar'-tar		n	×	×	×	×	×	The common term applied to salivary calculus.
Technic	tek'-nik		n	×	o	×	o	×	1. Same as technique. 2. Same as technics.
Technical	tek'-ni-kal		a	×	o	×	o	×	Specially or exclusively pertaining to some particular art, science, trade, occupation, or the like.
Technics	tek'-niks		n	×	o	o	o	×	1. The doctrine of arts in general. 2. Technical rules, terms, methods, etc., peculiar to an applied art, science, or study; as dental *technics*, operative *technics*.
Teething	tee'-thing		n	×	×	×	×	×	Dentition.
Temperament	tem'-per-a-ment		n	×	×	×	×	×	That individual peculiarity of physical organization by which the manner of acting, feeling, and thinking of every person is permanently affected.—*Century.*
Tetartocone	te-tar'-to-cone		n	o	o	o	o	o	Postero-internal cone; the fourth cusp of the fourth upper premolar.—*Scott.*
Tetartoconid	te-tar-to-con'-id		n	o	o	o	o	o	Postero-internal cone of the lower premolars.—*Scott.*
Thecodont	the'-co-dont		a	×	o	o	o	×	Having fangless teeth, as a lizard.—*Owen.*
Thirds (of surface)									The division of a tooth crown into (1) occluding or incisive third, (2) middle third, and (3) cervical third, or, in the other directions, mesial, middle, and distal thirds.—*Black.*
Thrombus	throm'-bus		n	×	×	×	×	×	A clot forming in a blood-vessel, usually due to an impediment in the circulation or to some alteration of the vessel walls.
Tooth (Pl. Teeth)			n	×	×	×	×	×	A specialized dermal structure, situated in the oral cavity, containing a calcified osseous tissue called dentin.—*Wortman.*

Torsion	tor′-shun	n	×	×	×	×	×	The act of twisting, or the state of being twisted, as *torsion* of the superior central teeth.
Toxoglossa	tox′-o-glos′-sa	pl.n	×	o	o	o	×	Animals having arrow-shaped teeth.—*Tryon.*
Traction	trak′-shun	n	×	×	×	×	×	The act or method of drawing, or the state of being drawn. The act of moving teeth by a drawing motion.
Transplantation	trans-plan-ta′-tion	n	×	×	×	o	×	The operation of inserting a natural tooth extracted from the jaws of one person into a natural alveolus of another.
Triangular Ridge	tri-an′-gu-lar	n	×	o	o	o	o	The ridge running down from the point of a cusp or tubercle toward the center of the crown.—*Black.*
Triconodont	tri-con′-o-dont	a	×	o	o	o	×	Having three cones in a line.—*Osborn.*
Transverse Ridge		n	o	o	o	o	o	A ridge extending across the crown of a superior molar.—*Black.*
Trigon	tri′-gon	n	×	o	o	×	×	A triangle. Applied to the first three cones of an upper molar.
Trigonid	tri-gon′-id	n	o	o	o	o	o	The first three cones of a lower molar.—*Osborn.* [*Osborn.*
Trigonodont	tri-gon′-o-dont	n	o	o	o	o	o	A tooth having three cones in a triangle.—*Osborn.*
Tritocone	tri′-to-cone	n	o	o	o	o	o	Posterior external cone of the upper premolars.—*Scott.*
Tri-tubercular	tri-tu-ber′-cu-lar	a	×	o	o	o	×	Having three tubercles, as molar teeth.—*Cope.*
Tubercle	tu′-ber-kl	n	×	×	×	×	×	A small rounded eminence on the occlusal surface of a molar tooth; a cusp.—*Thompson.*
Tusk	tusk	n	×	o	o	o	×	A prominent incisor or canine which protrudes some distance beyond the lips.
Twelfth-year Molar		n	o	o	o	o	o	The permanent second molar. (*Obsolete.*)
Ulcer	ul′-ser	n	×	×	×	×	×	An open sore in the soft tissues of the body attended with a secretion of pus or other discharge.
Uncini	un-si′-ni	pl.n	×	×	o	o	×	The external teeth on the odontophore.—*Tryon.*
Undercut	un′-der-cut	n	×	o	o	o	×	A depression made beyond a general surface for the purpose of retaining a filling.
Vacuum (chamber)	vak′-u-um	n	o	o	o	o	o	A space entirely devoid of matter; applied to the depression in dentures calculated to assist in retaining them in place.
Weld	weld	v	×	×	o	o	×	To unite or consolidate; as weld to gold in a filling.

List of synonyms submitted by Dr. Kirk :

SYNONYMS.

- Anterior, Front, Oral
- Posterior, Back, Buccal
- Cuspid, Canine, Eye, Stomach
- Deciduous, Temporary, Primitive, First
- Adult, Permanent

Teeth.

- Single, Simple
- Buccal, External, Outer
- Lingual, Internal, Inner, Palatine, Palatal
- Mesial, Anterior
- Distal, Posterior

Root.

- Upper, Superior
- Lower, Inferior

Maxilla.

- First Permanent, Sixth-year
- Second, Twelfth-year
- Third, Wisdom-Tooth

Molars.

- Bony, Osseous — Structure.
- Buccal, Outer — Cusps.
- Nerve, Pulp — of Tooth.
- Lingual, Inner.
- Mesial, Anterior.
- Distal, Posterior.

- Alveolus, Socket, Bony Cell.

Dentinal

- Fibrils.
- Fibrillæ.
- Tubules.
- Tubuli.

SECTION II.—Continued.

Supplemental Report on Prosthetic Nomenclature.

By GRANT MOLYNEAUX, of the Special Committee.

THE report that I have is supplemental to Dr. Guilford's report, and is in the same line, but pertaining to prosthesis.

The department of prosthesis differs in its nomenclature from the other departments of dentistry in the fact that it contains a great many common words to which we have given a distinctive meaning, and to which the definitions, as found in the dictionaries, would not be applicable. For example, the words "cast" and "model" are often used by dentists as synonyms. The former is found in one dictionary only. "Model," in the sense used by dentists, is not recognized in any of the dictionaries to which I have had access.

The accepted meaning of "model" is, "a mechanical imitation or copy of an object; something to be patterned after; anything of a particular form or shape to be imitated."

The word "cast" is given a special meaning in only one dictionary. In all others it is given the general meaning, as, "anything formed in a mold; a mass of plastic material which has taken the shape or form of some cavity."

While many dentists use these words interchangeably, others give them a distinctive meaning, as follows:

A "plaster cast" is a fac-simile of a mouth, in plaster of Paris, upon which a denture of celluloid or vulcanite base is to be molded; a plaster cast for vulcanite; a tin cast for molding celluloid; a marble-dust-and-plaster cast for Watt's metal. When the plaster cast is to be used for making a mold for dental dies, to be used for swaged work, it is then called a "model," because it is then to be imitated in metal, and then only is it to be called a "model."

This certainly seems to be a very excellent method, for, by using these terms with a distinctive meaning, description is abbreviated by doing away with explanatory sentences. Thus, when we refer to a

"cast," we shall know exactly what it is. When we refer to a "model," we shall mean something to be imitated in metal.

"Vulcanite" and "rubber" are often used as synonyms, the former certainly being the proper term. Caoutchouc or rubber is a definite hydro-carbon. When this substance is combined with sulfur and other ingredients and is vulcanized, or hardened, by subjecting it to a definite temperature for a definite time, it forms a different compound, which in no manner resembles rubber, but is an ivory-like substance which we term vulcanite.

"Velum" and "obturator" are used by many interchangeably. It seems to the committee, however, that such terms can be given a distinctive meaning, even if the function of these appliances be one and the same. By applying "obturator" to vulcanite appliances used in the treatment of cleft palate, and "velum" to flexible vulcanite, the terms seem to be sufficiently suggestive to be retained.

In the metallurgical department we have many terms used improperly, such as "white metal," "platinized silver," "platinized gold." It is not infrequent to hear the term "platinized gold" used when referring to gold alloyed with platinum, often called "clasp metal" and "spring metal."

The most modern information on this subject says, "A metal *covered* by platinum is platinized; preferably by electrolysis."

I will refer to the definitions of the Century and Standard Dictionaries. The former says: "Platinize; to coat with platinum in a fine state of division; platinized, by dipping in a solution of platinum chloride and then heating in a closed chamber until the metal decomposes." According to the Standard: "Platinize; to coat with platinum, preferably by electrolysis."

In order to get an idea of this matter from a goldsmith, I sent for a piece of platinized gold of definite gauge, and received a piece of metal, one side being gold and the other platinum, equal weights of the two metals, welded so as to be inseparable.

We have the same combination in the supply-houses, known as "platinized gold" or "crown gold," "platinum and gold crown-metal."

The best authorities say "platinous" is the proper word, as "platinous silver," silver *containing* a small percentage of platinum; "platinous gold," gold *containing* a small percentage of platinum.

It also seems that "platinous silver" is to be preferred to the term "white metal," as the latter term is vague and inexpressive, for there are many combinations of nickel known as "white metal."

By adhering to the use of "platinous alloy," "platinous silver," "platinous gold," we have a term that means exactly what it says. It is strictly in line with chemical nomenclature, and is susceptible of improvement. We have now one combination of platinum and gold which we know as "clasp metal." Suppose we call it "platinous gold." If for any reason the proportion of platinum in an alloy needs to be increased, we can then have a platinic alloy. If we need to have more compounds, the word is susceptible of improvement by the prefixes "hyper" and "hypo," so that we can always designate the compound by a definite term. While it does not now seem that these improvements are necessary, the word "platinous" is the proper one, according to all authorities, and should be adopted when referring to clasp metal or spring gold containing a small amount of platinum, instead of the term "platinized gold."

There is at the present time a good deal of discussion as to the words "aluminum" and "aluminium." A rule has obtained for fifty years or more which designates the rarer metals by an extra "i," such as "palladium," "osmium," "rubidium." When the metal comes into common use, the extra "i" is dropped, as in the case of aluminum. This would seem to be an excellent rule to follow, because it distinguishes the rare metal from the metal in common use.

Dr. Black has suggested substituting the name "occluding frame" for the word "articulator," in order to be in harmony with the nomenclature of the dental anatomy. Your committee suggest the continuation of the term "articulator:" First, because of its long usage; second, because it is a single word; third, because it is a word which is more suggestive of the operation to be performed, and we cannot see that it will in any manner interfere with the nomenclature of the dental anatomy.

"Autogenous soldering" is a term often applied to the process which we know as "sweating." The best authorities tell us that it is used erroneously in this sense. It is not quite decided what word would be best, "welding," "sweating," or whether to adopt the term "autogenous soldering." It is still under consideration.

The words "prosthesis" and "prothesis" are used as synonyms. The meaning of the prefixes being slightly different in the original language, "pro" meaning "to put before or to stand before;" "pros" meaning "to place, or to put to place or position," the committee has adopted the word "prosthesis" as being the proper term to use.

SECTION II.—Continued.

A Basis for Dental Nomenclature.

By A. H. THOMPSON, of the Special Committee

THAT dental nomenclature is in a barbarous condition is admitted on all hands. What little system we have is crude and chaotic, and our terms are clumsy and unwieldy in practice and mostly unscientific in origin and development. Like all systems of terminology, ours is more or less arbitrary and artificial, and has grown by the accretion of accidental terms, coined and applied without reason and often without appropriateness or discrimination.

It is true, of course, that names must often be applied without reference to meaning or relationship to the thing named. Words that are self-explanatory and descriptive cannot always be found, especially when things that are entirely new to science are to be named. Names for new things must be root-words, from which whole series of related terms, descriptive of properties or functions or relationships, etc., can be elaborated. This is illustrated by the recent nomenclature of electric science, in which new things have been discovered or invented which required new and distinctive names, and those names are root-words from which secondary terms are derived.

In dental nomenclature many names have come down to us, some of which are awkward and indefinite, but must now be accepted because established by usage, and it would be impossible to change them. Others well express meanings and descriptions, and lend themselves to the uses of root-words for the derivation of explanatory terms. The primitive names applied to the teeth and their gross parts must now be accepted, but it is not too late to control and render scientifically correct the new and derived words for minute regional anatomy, functional characteristics, etc. While many

early names were merely arbitrary, others were quite descriptive, and all must now be accepted and the best use made of them that may be possible, in order to avoid confusion by attempting too much change.

It is generally conceded that our nomenclature is greatly in need of correction and codification, and to that end the first thing to be considered is a starting-point. To all students of the subject it would seem that this is furnished all ready to our hand by Dr. G. V. Black, in his admirable study and *résumé* of the subject given before the World's Columbian Dental Congress and published in the Transactions (vol. ii, p. 825). He has there given the history and philosophy of the subject in a manner that is complete and exhaustive, and that will render any other work in that line superfluous. This great paper is a landmark in the history of dental nomenclature, and may well serve as the starting-point for a new departure. Without wasting time in the discussion of the desirability of having an established nomenclature, on which we are all agreed, we might as well proceed at once to formulate a code arbitrarily.

This can best be done by the American Dental Association, which is the national representative body of the profession in this country, the exponent of the opinion and policy of the profession, and as having authority in deciding questions of general interest to the profession. A decision emanating from this body would be held in respect by the profession, and the code of terms of nomenclature would be final and would gradually come into acceptance and use. A start must be made, and it must be arbitrary, and this body is the only proper organization to take hold of the matter.

A list of the terms in general use should be submitted this year, to be known as "The Code of 1895," and lie over for one year to allow time for discussion and criticism by the profession at large, and then be adopted, with whatever corrections and amendments may seem desirable, at the ensuing annual meeting. Lists of terms in all departments can be added to this code from year to year, as may seem desirable, by being proposed and submitted, laid over for one year for criticism and discussion, and then adopted. Newer terms in regard to some disputed points will provoke discussion, but they must be decided, and decided finally. A year's discussion will probably result in satisfactory terms for the points in dispute.

The writer is disposed to think that terms can be borrowed from the naturalists in naming the parts of teeth, that will dispense with many

cumbrous combinations now in use in our literature. Some are offered in the list submitted, and others will be included in the list of names for comparative dental anatomy.

A systematic dental nomenclature should be founded on the zoological system of names of the teeth of mammals employed by naturalists as a basis; on this should be placed a professional nomenclature, like Dr. Black's, for the use of dentists; and on this a still more minute mapping system for the localizing of cavities, something like that prepared by Dr. Kulp. The three systems are indispensable. First, the gross descriptions of teeth; second, the detailed descriptions; and third, the minute localization of areas on the surfaces of the teeth. Some arbitrary system of localizing cavities, like Dr. Kulp's, is desirable, to avoid the cumbrous combinations of compound words which would otherwise be necessary. Dr. Kulp's plan of mapping the crown is the best of the kind, perhaps, yet offered. This is a matter that must be considered wisely before the final adoption of any system of minute description, such as is required in locating cavities.

But the matter is merely to be inaugurated at this meeting, and the list submitted. Then the work must be continued from year to year, proceeding slowly, in order to give ample time for discussion and suggestion. The Committee invites suggestion and correspondence, to the end of obtaining a complete list, and that the code adopted may be harmonious and satisfactory to the profession.

DISCUSSION.

A MEMBER: Let us hear from Dr. Black.

DR. BLACK: Mr. President, I should have preferred not to have opened this discussion, but to have heard from others first. The importance of the question is such that it merits our closest care and attention. I will not undertake at the present time to speak especially of the words to be employed, but rather of the general subject.

In order that we, as a profession, may succeed in adopting *and using* a nomenclature, great care must be exercised. While the selection of words, and of rules for the uses of words, are of great importance, and while this may be well and systematically done by committees, all of this will not succeed unless there has been a careful and judicious effort made to harmonize different ideas of members of the profession and of different sections of the profession in the uses of this nomenclature. This has been the great difficulty in medicine. We may almost say to-day that medical science has no nomen-

clature. Some of the specialties have, but for medicine in general there is practically no accepted nomenclature.

Now if we have a nomenclature in dentistry,—and I think all will admit the advisability, the desirability, and the necessity of a well-fixed nomenclature,—we must arrange ourselves into groups for the study of this subject and for the distribution of the use of this nomenclature. It should not only be taken up by this Association as an association, but more especially should it be taken up by the Faculties Association. And the uses of a nomenclature, as it may be adopted, in the teaching by the members of these faculties, should be enforced, and the recognition of a college should depend upon that as a main consideration. Now this may sound to some of you a little bit harsh ; but if you go back and study the formation of nomenclature in botany and zoology, you will find it is not nearly so hard as some of the proceedings that have been resorted to by these bodies ; and there are none of these that are really hard.

It is not necessary that we wait for a complete nomenclature to begin this work in the Association of Faculties, to begin this work in our schools, to begin this work all through the profession, indeed, because a nomenclature in a live science, in a science that is progressive, is never complete. My advice to the dental profession, to the colleges, to the teachers all over this land, is for them to organize on this subject, formulate their nomenclature so far as they can (not completely, for they cannot do that), print this nomenclature, and require that in the teaching of students it be used. Gentlemen, if you will do this, and make an effort to work upon lines of harmony, it will be but a few years before the dental profession will have a nomenclature to which it can point with pride, and which will lessen by very nearly one-half the time required in teaching any one individual subject in dentistry. Talk about the use of technical words being cumbersome ! There is no vocation followed by any set of men in this country that can succeed without its technical words. Take the plasterer. He has his technical words, and the uses of these technical words in that business are almost as closely followed as the uses of the technical words in botany to-day. And we know that this science, on account of its multiplicity of terms, is one of the most rigid in its use of technical words.

The boot-black makes a noun out of a verb, and the philologist must take off his hat to him. "Have a shine, sir !" He controls the use of that word. Now, shall we do the same thing? We

should do the same thing, for by doing so we lessen the difficulties of the student, and in lessening those difficulties we add to his time and lessen his work.

These are in brief the principal reasons and the principal plans for getting at the doing of this thing. This Association alone cannot do it. This Association is properly the starting-point from which the whole should be controlled, but it is necessary that it be organized throughout the ramifications of the profession, and especially that it be organized in the college and journal work. If the colleges will unite and do this, it will not be many years before the whole profession will be united upon it.

Of course we must have discussion of this word and that word. We must have discussion of the whole field of this subject, and it should not be done hastily. Nothing in this line should be done hastily. It should require years of work, and we should start into it with the view of following it up continuously, even after we have formed this nomenclature, as perfectly as we can at present. As I have said, so long as we progress, we must continue it. We can never stop.

It has been mentioned in the report that we should attend particularly to the nomenclature in English. Let me just say here that we cannot attend to the nomenclature for the English language alone. Whatever we do here to-day is done not only for the English language, but for the German language and the French language, particularly for these three great languages. And what affects these three affects all others. We are to-day, by our work here, affecting the languages of the world, and we should have an eye to that fact in what we do. In the selection of roots of words particularly, we should not only look to the usage of the roots of these words in the English language, but we should look to the usage of the roots of the words in the German and French languages. Take the word "abrasion" for instance. We, in English, speak of the teeth being abraded when we find them worn by mastication. I turn to an author in the French language, and find that he uses the word abrasion to express the operation of removing calculus from the teeth, and he has followed the original meaning of the root as carefully as we have in English. All these things must be looked to in the selection of words and the formation of our nomenclature.

Even in the German to-day—the language that is most tenacious of its own words—the words that we are now using in English to

express the surfaces of the teeth are being very largely used. When I was studying this subject of nomenclature, the best list of these words derived from the English language that I found was in the French language. This is simply to illustrate the fact that what we are doing in the English language upon this subject of dental nomenclature cannot escape its effect upon the other languages of the world. Hence, we want to follow the changes of meaning and the uses of roots in these three languages particularly.

For instance, take the word "mordeo" as it comes down to us through those three languages. The word "mord" in German means murder, to bite, to kill. That is the old original meaning of the word "mordeo;" it means to destroy life by violence in some of the other languages. So it is with a great many of the Latin roots and of the Greek roots as we follow them down through the other languages. We find they have acquired meanings in some languages that prohibit their use for purposes that might be acceptable in the English language. One of the best ways to carry on this work is to find some man who is inclined to work in this direction and who has the education in language and a taste running in that direction, who will take up this subject as a specialty and be the leader of the committees and so forth that are formed. That has been found to be best in the other sciences, and we may find some dentist who has that particular tact, the education necessary to make him successful, and the inclination to follow it. Such a person should be sought earnestly.

DR. STELLWAGEN. In the matter of nomenclature and in the use of words in general there has been a dread of the subject, caused by the fact that our dictionaries are so enormously large. For example, look at the last International or the new Webster's Unabridged. We all acknowledge at once that we never can conquer these thousands of words. A method of study which probably is not either original or novel has been of such great assistance to me that I adopted it and recommended it in the Philadelphia Dental College. It is simply the selection of about two hundred words and applying their etymology in the study of additional ones. With the students it seems to have acted as a guide, as it did with me. Inasmuch as the words that we use are like so many implements, it is ill to use them in such ways that their edges become blunted or ragged. We should keep them sharp. We should use each word exactly as it is intended to be used, and not be careless in throwing them together, as a heedless dentist might throw his cutting instruments into an

ordinary drawer and shake them together and thus destroy their edges. So the careless use of words impairs the prime object of language—to make ourselves understood. As you know, the most celebrated authors, men like Carlyle, who are famous for the number of words they use and for their command of language, really use very few words in comparison with the number in a dictionary. It is a matter of astonishment how very few words we ordinarily require. Only a few hundred are sufficient with which to express the ordinary subjects of conversation. The every-day duties of life can be expressed by the use of some two or three hundred, or a very few at most. This rather emboldened me to see what could be done in the way of acquiring a knowledge of the words that technically and strictly belong either to the dental profession or to the subject of physiology. Something less than two hundred, with their roots of words, may be said to act as a scaffold by which to build a substantial knowledge of the subject. For instance, having mastered the two roots of one word, to these add two more, and there will result a combination by which we could make several words. It resulted in an increasing geometrical series, so happily encouraging that some of the gentlemen of the class requested that the list might be printed. At my suggestion a blank page was placed opposite the printed ones, and upon this the student can make notes of other words as may be desired to add to the vocabulary. The consequence is that with a little book that one can carry in his vest pocket, we can keep ourselves in much better touch and have our verbal tools in a much sharper and better condition. Recognizing my imperfections does not dishearten me, for I have plenty of excellent company. Reading the Queen's English, the Dean's English, Good English, and Bad English brought me to the conclusion that I was in right good society at least.

DR. GEORGE E. HUNT: Mr. President, I should like a little information from this Committee. I have heard the word which is spelled n-o-m-e-n-c-l-a-t-u-r-e pronounced no-men'cla-ture by men upon whom I have a good deal of reliance. I wish to ask, What should be the Bible and text-book of the philologist if not the Century Dictionary? The Century Dictionary gives the preferred pronunciation as no'menclature.

THE VICE-PRESIDENT: Will the Committee answer Dr. Hunt's question?

DR. GUILFORD: I will simply say that I examined into the pro-

nunciation of this word along with others, and I found invariably that the accent was on the first syllable, no'menclature. I could find no authority for pronouncing it in any other way.

DR. BLACK : I have not become sufficiently accustomed to it to always pronounce the word according to the latest authority. The latest authority that has acted upon the pronunciation of that word is a committee of the American Association for the Advancement of Science, and according to the action of that committee the word should have two accents,—*nō*men*clā*ture,—placing the accent on both those syllables. That is their rule for accenting all these compound words,—*i.e.*, accent the principal syllable of the original words. All of those words that are compounds receive two accents. I should pronounce this word *nō*men*clā*ture.

DR. WEEKS : The example given by Dr. Guilford, with the question asked by Dr. Hunt, and the mental reply of many of us to our mental accusation that we frequently mispronounce words that we know how to pronounce, only emphasize the fact that, in pronunciation as well as in the application of terms, there is much room for improvement. When the dental profession adopt a system of nomenclature, as has been suggested,—one which may be modified and added to year by year,—we shall be less apt to mispronounce and misapply terms.

I apprehend that there is nobody more competent to take up this matter than the American Dental Association ; and I, for one, was rejoiced when the Committee was appointed. I hope that the Committee will be continued ; that the work may go on.

The suggestions made this morning nearly all seem to be pertinent to this question. Every gentleman in the room who has had any experience in teaching, and especially primary teaching, knows how difficult it is to teach students definitely when you have no definite set of terms, when good authorities are disagreeing on the use of terms. You teach young men certain terms ; at the first dental association meeting to which they go they listen to the remarks of gentlemen standing as well in the profession as their teachers, and who use the terms in an entirely different way. So they are all mixed up. Now we must agree upon our terms in some way. It seems to me that we are on the right track, and I hope that the Association will uphold this Committee and further its work along the lines in which we have started.

DR. BARRETT. I wish the attention of the profession might be

more distinctly and pointedly called to certain solecisms in our language, that are so common among us and that amount to absolute barbarisms. I refer to the use of such terms as "six-year-old molar," the "fangs" of teeth, etc., which are sometimes extremely offensive in their application. It is the misuse of the common technical names of certain parts of the anatomy and their substitution by provincialisms of speech that make us the greatest offenders against all philological laws. While we desire to look through the whole terminology and to establish a general definite rule of pronunciation for all our technical terms, yet these exceedingly gross violations of all kinds of proper names should first engage our attention. With regard to the word "nomenclature," I believe it is a rule in the Latin and in terms derived from that language, that in words of three or four syllables the accent is never upon the penultimate. It may be upon the antepenultimate, but never as a general rule upon the penultimate. That would exclude the stress which is sometimes placed upon the next to the last syllable, and would make the pronunciation of the word "*nō*menclature."

DR. THOMPSON: Of course it is the work of the Committee to correct all those things that Dr. Barrett has referred to, but he must not expect the Committee to do it at once, nor very soon. This is a work that is continuous, and, as Dr. Black has well said, will never be completed. We shall do our work now as well as we can, and hand it on to our successors.

In the matter of pronunciation there are some things that need to be corrected. For instance, in regard to the use of the word "alloy:" there are properly two pronunciations of the word. The first is "*al*-loy," the noun, and the next is "al-*loy*," the verb, as I understand it, thus, to al-*loy* gold with an *al*-loy. The same in regard to the word "cement." "*Cem*-ent" is the noun, "ce-*ment*" the verb. That is, you ce-*ment* a thing with *cem*-ent. These matters must be distinctly understood in order to correct pronunciations, especially where it is desirable to discriminate finely, as between the noun and the verb.

DR. GUILFORD: Dr. Stellwagen has spoken of words, comparing them to tools, which is a very happy simile. Words are really tools with which we work. If a mechanic, for instance, had a nail to drive, and he drove it upon one occasion with a hammer, upon another with a monkey-wrench, and the third time with a piece of crude iron, we should not think much of him, and yet that is exactly

what we have been doing heretofore. We have been using a number of different words to express the same idea, and we have had nothing but confusion. It has rendered us unscientific in the minds of the general public. I desire to say that in offering this report the Committee simply wishes to show what it has done. We want it printed in the Transactions, and hope that every society in this land will take up the subject and discuss it, and we want every man in the dental profession to constitute himself a committee of one to hunt up these words for himself, to make himself acquainted with them so that he may be able to criticise, and then, if by this time next year we have decided upon the proper use of a large number of words, let us have that list published, and let the teachers in the colleges use it in teaching their students. Furthermore, let these words, as fast as they are accepted, be adopted and used by the editors of our dental journals, because nearly all of our literature comes through those channels, and if the editors and teachers will use the approved terms, we shall soon bring about a very acceptable change.

SECTION II.—Continued.

An Opportunity for a Great National Museum.

By WILLIAMS DONNALLY, of the Section.

WE are told that long centuries before the invention of written language there lived a people whom the later Greeks called Thracians, a half-mythical race, who, after their language perished, survived in tradition as a race of bards, associated with that pre-Homeric legendary poetry in which the powers of nature were first definitely personified. While spirits were ascribed to every forest and mountain, in Thrace alone dwelt the Muses, and to their home was the first application of the word museum. Soon, however, the word was applied to a place of study,—a building devoted to science, learning, and the fine arts. The first of this kind was the celebrated Alexandrian Museum, which contained the Alexandrian Library and was "a great university, the abiding place of men of science and letters." In the second century Athens was spoken of as "the Museum of Greece."

The term museum dropped out of use, and the idea for which it stood was in disfavor from the fourth to the seventeenth century.

While prototypes of modern museums devoted to natural history, the fine arts, and the products of the civilization of the day undoubtedly existed among the ancients, there was nothing analogous to the museums of the present day devoted to the advancement of particular branches of science and to the development of the industrial arts. The history of museum and library runs in parallel lines, so that the museums of later times were made possible only through the development of an abundant literature, the division of science and art, each with its separate and distinct literature and its savants devoted exclusively to limited fields of research.

The idea of a great national museum of science and art was originated by Lord Bacon in his "New Atlantis," and the Ashmolean Museum at Oxford, the first of this kind, was founded in 1667 by Elias Ashmole. In 1753 the British Museum was established by act of Parliament. Now, there are over one hundred and fifty public museums in the United Kingdom, all active and useful. That these institutions have an increasing intrinsic value is illustrated by the statement of competent authority that while in 1882 the South Kensington Museum had cost the nation $5,000,000, its value at auction on the premises was not less than $100,000,000. All civilized nations have National Museums and Libraries in some degree commensurate with the greatness of the nation and the spirit and progress of its people. The older countries, England, France, Germany, Italy, and Japan, it must be confessed, are yet in this respect ahead of the United States and more in harmony with the spirit of their respective peoples, though the work here, under the patronage of the government, is rapidly making toward magnificent proportions, as will appear from facts to be presented later.

The "Great Exhibition" of 1851 in England and our own Centennial Exhibition in 1876, themselves great museums gathered together at short notice, were great object lessons to the people. The former was the chief feature in the industrial revolution of England, marking an epoch in the intellectual progress of English-speaking peoples, while the latter was in less degree to the people of this country a revelation of undreamed-of possibilities in their development.

The vast quantities of valuable museum material left by great expositions to the permanent museums of the respective countries in which they have been held, though valuable, form but a small proportion of the immense collections accumulated by steady growth through contributions to such of these institutions as are constantly active.

Whether or not great public Museums and Libraries are yet in the infancy of their development, they are certainly in a state of transition. Their present aims and means are rapidly transforming them into great laboratories for original investigation by students in every department of knowledge, their libraries are collections of books in every branch of learning, their halls are great "nurseries of living thoughts" for the education of the public by object lessons, and their influence goes out indirectly to remote parts through their direct educational value to the educators of the country.

So much as a brief sketch of the history and development of the museum idea, from which I turn to invite you to a closer view of their objects.

All educational methods are changing. In the Middle Ages ignorance was the rule; now it is the exception. Learning and professional training were then open only to the opulent classes; now we glory in "the democracy of letters" and the equality of opportunity. Then, and until much more recently, written language, cumbersome and affected by the "element of personal equation" as it is, afforded the chief means of educating. Now, this is supplemented by swifter, more direct, and more natural means, and even the more recent methods of illustrating tedious written and oral descriptions by means of diagrams, blackboard drawings, photographs, and stereopticon views are being superseded, wherever possible, by the presentation of the objects themselves, thus bringing the student into direct contact by means of the senses of touch and sight with the material substance, both in individual specimens and naturally-arranged groups. By this means more is revealed through the eye at a glance than could be taught accurately by any other means in hours. The mind is not only more readily and agreeably instructed through the sense of sight, but "to See is to Know." Hence, museums are for the education of the general public as well as for the man of science and the man of letters. Their collections are so arranged as to best educate the public,—"houses full of ideas, arranged with the strictest attention to system,"—and their laboratories and libraries are of the best to aid in original investigation and the extension of the bounds of knowledge. They are fast becoming the centers of learning where the men of greatest attainments in science will be found.

Allow me to quote freely, to show the possibilities of the museum, Professor G. Brown Goode, Assistant Secretary of the Smithsonian Institution, in charge of the United States National Museum: "It is the most powerful and most useful auxiliary of all the systems of teaching." "The museum of the future must stand side by side with the library and the laboratory as a part of the teaching equipment of the college and the university, and in the great cities cooperate with the public library as one of the principal agencies for the enlightenment of the people." "One of the saddest things in this life is to realize that in the death of the elder members of the community"—and he might have added a profession also—"so

much that is precious in the way of knowledge and experience is lost to the world." "The museum cultivates the powers of observation, and the casual visitor even makes discoveries for himself." "The proximity of a good library is absolutely essential to the usefulness of a museum." "The library is useful to the educated, the museum to the educated and uneducated alike."

Professor Huxley described the museum as "a consultative library of objects." That our National Museum bears out this description is evidenced by the fact that it is visited by more than one thousand persons per day, and exhibits in spacious halls probably four million specimens, arranged not only to attract, but to instruct; besides, it contains in storage and in laboratories immense collections for the student and experimentalist, and from these latter, by a system of exchange, other collections are enriched and specimens are supplied to the investigator wherever he may desire to use them.

While museums in their two rather vague divisions of science and art attempt to cover the whole field of human thought and interest, there is an increasing tendency to specialization, and from this we may expect a nearer approach to perfect work and a more direct influence upon the separate departments of human activity. For an example of this idea, refer to the Museum of Comparative Zoology at Cambridge,—the chief of its kind,—"founded to illustrate the history of creation as far as the present state of knowledge reveals that history," and of which a great English naturalist said "it is far in advance of similar institutions in Europe as an educational institution, whether as regards the general public, the private student, or the specialist;" or take the "Medical Museum of the Royal College of Surgeons" in London, the first in importance of the thirty museums of anatomy that have developed as parts of medical colleges, and which was for the first twelve years of its life the private collection of the famed John Hunter; or, better, let us take the magnificent Army Medical Museum and Library at Washington, the most unique of its kind in the world, as an example of the success of specialization, and we shall have reached the kernel of my theme.

Happily for you, most of the description of this institution will be in the cogent language of Dr. John S. Billings, Deputy-Surgeon General and Librarian in charge, whose keen appreciation of the ideal medical museum and library, wise administration, and herculean labor have brought to this institution universal renown and the well-deserved appreciation of the whole medical world.

He says, "At first the Army Medical Museum was limited to military medical subjects, but of late years its scope has been greatly broadened, and is now nearly the same as the Royal College of Surgeons. It includes human anatomy, physiology, pathology, somatological anthropology, instruments and apparatus, and illustrations of methods of teaching connected with special departments of practical medicine. It does not at present include hygiene or materia medica, except in their immediate relations to the military medical service. . . . ." The reasons for this are that our National Museum of Hygiene is under the direction of the medical department of the Navy, and the National Museum covers the field of materia medica very thoroughly. "It is not an anatomical museum, but a medical museum. The broad field of general biology, including natural history and comparative anatomy, will ultimately be covered by the National Museum, and in our medical collection it will be quite enough to illustrate human anatomy fully, using so much of the structure of the lower animals as will be useful in explaining why certain parts of the human body are thus and so, and not otherwise. No sharp line of distinction can be drawn between the field of work of the general and that of the medical museum. So far as morphology is concerned, they must necessarily overlap somewhat, since both want a certain number of the same specimens, although using them to illustrate different points of view."

"As a rule, single specimens of abnormity or of disease have little scientific value. It is only when they are associated with others that they both furnish and receive light." "Colored drawings, casts, and models are of great value in supplementing original specimens, but they cannot wholly replace them."

"A good preparation, whether of normal or abnormal structure, but especially of the latter, is valuable, not only for what we can see in it, but also for what we overlook or misinterpret, and which our successor may see and see rightly. In this it is better than a mere description, yet the latter is equally necessary and much more easily preserved and made generally useful. Next to the preparation itself in accuracy and completeness of record is the photograph, and next to this is a good model or a careful drawing.

"In medical and surgical matters, as in most other things, we habitually think in terms of vision as interpreted by touch. Hence, in part, the importance of the so-called object-teaching, and the fact

that what the medical lecturer shows his class will usually be much better remembered and understood than what he says to it; and, while pictures and diagrams are of great assistance, they are by no means as instructive and suggestive as representations in three dimensions,—*i.e.*, models, if the thing itself is not available.

"One of the most important sections of our museum is that devoted to microscopy, including normal and pathological histology, and photomicrographic work. In the cabinets there are many thousand mounted specimens, illustrating almost every field of microscopical research, forming a very valuable series, to which additions are being constantly made, and the materials for which we are especially anxious to obtain. In connection with this section a series of cultures of chromogenic and pathogenic bacteria is kept for museum exhibits, and also to illustrate methods of work.

"We have also fitted up one large room with instruments and apparatus for anthropometry in its widest sense, including psychophysical investigation, and it is intended to make this a complete laboratory for illustrations of methods of work.

"An important feature of our National Medical Museum should be to show methods of research and of instruction for the benefit of the investigators and teachers of the country. This includes instruments and apparatus, and, to a limited extent, illustrations of the modes of using them, and of the results; it also includes diagrams, models, etc., used for illustrating lectures. For example, as soon as Koch's researches became known in this country, physicians, and especially medical teachers, who visited the museum, asked if we could show them the apparatus used by Koch and Pasteur in bacteriological work, and eagerly examined the specimens of cultures on solid media which we were able to exhibit. The anatomist comes to the museum quite as much to see the methods of mounting and preservation, as to see the specimens themselves; the physiologist does not expect to see function directly exhibited, but he does hope to find information about kymographs and constant temperature apparatus, and he wants to see whether Kühne's artificial eye is so useful for teaching purposes that he ought to get one to illustrate his lectures. Medical museums are not, as a rule, freely open to the public, nor are they collected and arranged with reference to instructing non-professional persons. The Medical Museum at Washington is the chief exception to this rule, and the public has gradually become accustomed to consider the Medical Museum as one of the

sights of Washington, to be visited by male and female, old and young, and when a stranger comes to the city and inquires what he ought to see, this museum will probably be named to him next after the National Museum. Since the collection has been moved into the new building near that devoted to the National Museum, of which it may almost be said to form a part, the number of visitors has increased rather than diminished, and it has been found desirable to consider with care some problems which this state of things has forced on the curator. That educated men and women should have some curiosity as to the structure of their own bodies, the functions of certain organs, the arrangements of parts in certain localities where they have felt pain or discomfort, or the changes which have caused death in relatives or friends, is perfectly natural and proper, and there is no objection to gratifying this curiosity to a very considerable extent."

The value of the museum can be appreciated when we consider that on June 30, 1894, it contained 32,269 specimens; of which 12,249 were pathological, 4376 anatomic, 1717 illustrative of comparative anatomy, 12,033 microscopic, and 1894 miscellaneous. The cases are so arranged that they give the best view of the museum as a whole, and so that one can find the case in which he expects to see something of special interest to himself. Then, too, the system of arrangement of specimens in the cases is such as to clearly and forcibly set forth the object of the collection and arrangement, whether the development of a disease, or the changes which take place in an organ or other part of the body.

As has already been said, the laboratory work is constantly active. Dr. Billings, when questioned upon it, said that the work was largely in bacteriology, embryology, and microscopy, and that some work had been done on the embryology of the teeth and jaws.

Mr. G. Brown Goode says, "That the proximity of a good library is absolutely essential to the usefulness of a museum will be admitted by every one." The Army Medical Museum readily meets this condition, for in the same building, which, by the way, is absolutely fireproof throughout, is what is conceded by all to be the largest and most complete medical library in the world. The success of the library is due to the able efforts and management of Dr. Billings. How rapidly it has developed is shown by the authoritative statement that in 1872, had all the public medical libraries in this country been put together, it would not have been possible to verify

from the original authorities the references given by standard English and German authorities; but now the library is known all over the medical world, both for the immense collection of medical books, and for its enterprise in other lines.

The growth of the library is wonderful. In March, 1895, it was stated that there were 112,000 bound volumes and 180,000 pamphlets. At present there are 114,567 bound volumes and 183,778 pamphlets. The library contains three-fourths of the medical literature of the world, and nine-tenths of the medical literature of the past ten years. There are about 53,000 visitors to the museum and library annually; besides, the library is used by over 3000 students annually. The library receives medical periodicals to the number of 1200 from all over the world and in all languages. It also receives all the reports of the state and municipal boards of health, and it has the largest collection of medical graduating theses, and continues to receive them from all parts of the world. They are of little value except from a bibliographical point of view; but in this one respect they are quite valuable. The government appropriates the sum of $12,000 annually for the purchase of books and pamphlets, but the library has grown largely through the donation of private collections and the gifts of individuals. I said "has grown;" I should add, *it is still growing*.

"The value of this collection to the medical profession of the entire country, as well as to the medical and surgical department of the army, is almost beyond estimate. It affords a means of reference and research in every branch of the profession, and places at the disposal of seekers after knowledge the wisdom of the world and of its greatest savants collected for generations past."

When, upon the issue of the statement in 1872 concerning the scarcity of medical authorities in medical libraries, the condition of medical libraries in this respect became known, the medical profession of this country roused itself to the subject and began to take active steps to remedy this untoward condition of affairs, "and the Army Medical Library began to grow by accessions from gifts."

"It is to such special libraries that physicians give their books and pamphlets, and the rapid growth of the library is largely due to this cause. There is pouring into it a constant stream of literature, not only from this country, but from abroad. The result is that the library not only contains more literature than the Library of the British Museum or the National Library of France, but it covers a

wider field, represents better the medical literature, and is decidedly a better practical reference and working collection for medical purposes than either of the great libraries mentioned. The library also gets a great many books through the system of exchange with other libraries in this and foreign countries."

There are two publications which have a world-wide reputation, which are sufficient of themselves to indicate the enterprising character and far-sightedness of those in charge of the library. There is an Index Medicus of the current medical literature of the world which appears monthly, and at the end of the year is bound. This is prepared under the direction of Dr. John S. Billings and Dr. Robert Fletcher.

But the other publication is the greater of the two. It is an Index Catalogue by both subjects and authors of every bound volume and pamphlet in the library, and contains all the articles of value in the magazines, catalogued under subject heads. There are now fifteen volumes of this tremendous work, and each volume has, on an average, 1000 pages. Such an enormous expenditure of labor and patience, as well as time, could only be justified by the magnificent results. Encomiums have come from all parts of the world. Each new volume has elicited fresh praises. As far back as 1880 the Librarian of the Royal College of Surgeons of England, in speaking of this catalogue, said, "You do well, indeed, to lay down as one of the rules for its compilation that the catalogue is not for use only in the country of its origin, for it really is a magnificent present to the world at large, and one, I feel sure, from having so long known the want of such a work as regards periodical literature, which will be keenly appreciated by all into whose hands it comes."

Medical Inspector Vallin, Director of the School of the Department of Military Health, at Lyons, France, writes, "I have just looked over the eleventh volume of the admirable Index Catalogue, which you have been so kind as to send to me. . . . Each new volume which I receive increases my astonishment; there does not exist in the world a catalogue to be compared with it, and I scarcely understand how you have been able to conduct to its end a work so colossal. . . . Your Washington Library is, for medicine at least, the analogue of what the Alexandrian Library was for all human knowledge. I am convinced that while it will not be of the same kind, it will not render less services."

Contributors should remember that credit is given to the author

under both his name and subject-head in the Index Catalogue for every separate book, monograph, or pamphlet, but that when the article is in a magazine it is catalogued only under the subject-head. It is almost impossible to exaggerate the value of this work. It is to the world of medical books what the index of the *Dental Cosmos* is to the literature of that journal, and it saves many valuable facts which would otherwise lie buried in journal obscurity.

Notwithstanding the fact that the medical profession is divided into many specialties, each is more or less represented in the two branches of this institution, though the number of works in the library relating to dentistry is far below a creditable showing as compared with some of the other specialties, and the specimens in the museum are but the beginning of a collection. No one is to blame for this but the members of the dental profession themselves, for there is not the least distinction made by the officers of this institution between dentistry and the different specialties of medicine. Dr. Billings has expressed to me surprise that his efforts to awaken the dental profession to a realizing sense of its interests in this regard have met with but little success. Here has been prepared for our acceptance and made available for our use, without effort or expense on our part, an institution offering grand opportunities almost wholly neglected,—neglected in a way that does not comport with the dignity, aims, and boasted achievements of dentistry. It cannot but seem to some that we shrink from bringing to this great institution the evidences of our professional attainments to stand side by side in comparison with those of other branches of the healing art.

At this point your attention is called to the fact that while the Army Medical Museum and Library is the medical department of the general government, housed and maintained by Congressional appropriations and conducted by officers of the government, it is also the recognized and officially accepted National Museum and Library of the medical profession, and is as much, if not more, the interest and pride of the individual members of the profession as if it were under the control of their national organization. As a government institution, mature in experience and with an established policy, it is certain to be perpetuated under competent management. It is beyond the influence of professional jealousies and doctrinal feuds, and is based broadly and liberally on Medicine,—*i.e.*, everything pertaining to the healing art.

Thousands of the general public, as well as members of the medi-

cal and other professions, will form their impressions of the value of the attainments of the various branches of medicine and surgery by comparing here their exhibits of museum specimens, and for this reason, as well as because so much of dentistry can be illustrated with models, drawings, etc., we should make this the greatest object lesson in the world. This is certain by its nature to be the place of comparison and contrast, and, while we leave it to the medical managers to make what showing we have here, the result will be no less a just than an inevitable loss of prestige to dentistry, however sincere the efforts of the managers may be to properly set forth its progress and accomplishments. Nowhere else could we advance so well the long but faintly-sought object of impressing on army medical men and government officials the necessity and duty of providing dental surgeons for the army and navy, and in no other way could we educate the people of influence to comprehend the need of teaching and practically enforcing dental hygiene in the public schools. We have the opportunity of exercising a direct influence upon fifty thousand visitors a year, and an indirect influence upon many thousands more because of the intelligent appreciation and educating occupations of these fifty thousand people.

The quantities of museum material in single specimens and small collections hidden away in offices for a time and then cast away, lost to the profession because of the supposed want of a safe depository, where their value would be increased by association as parts of a complete series, would be of value to the profession and student of dentistry if sent here for preservation and exhibition. Besides, such collections and exhibitions cultivate observation and foster original research among both graduate and undergraduate students, and afford material for teaching and laboratory use in the dental schools of the country.

While this is a purely medical institution, it is one of the several scientific departments of the government, all of which work in harmony, each limited to its special field as far as practicable and supplementary to the others.

The opportunity for research lacking in one is supplied by the others; for instance, the Medical Museum has no department of materia medica, this being abundantly provided for by the great National Museum with 3368 exhibited specimens, 2086 duplicate and study specimens, with illustrations in colored plates and photographs. Again, in the Medical Museum comparative anatomy is lim-

ited by specialization, while in the National Museum the department of mammals covers the general field of comparative anatomy, very fully illustrating the development, general characteristics, and macroscopic structure of the teeth of the lower animals. The other departments of the National Museum are scarcely less interesting and instructive.

If we claim in sincerity that dentistry is founded in its principles and practice on science and art, we should seek its development along the same lines and in company with the collateral sciences. Whether our rightful position is regarded as an independent profession, a specialty of medicine, or a branch of the healing art apart from the recognized branches of medicine, there can be no question as to the prestige we would gain for dentistry if we would but build with wisdom and deliberation for the future, as we work with zeal for present objects, on the opportunity here offered for friendly competition with the specialties of medicine with which dentistry stands equal in the scientific departments of the government.

Never was there such an opportunity freely offered a profession to safely and certainly perpetuate the fame and effect of its achievements, to give it a higher place among the learned callings, to acquaint the professions and the general public with its acquirements, and to secure to it a depository of all things of present or future historical and educational value,—a depository already famed as the richest in medical lore, and further enhanced by its unequaled Index Catalogue.

In closing I am constrained, by love of our profession, zeal for the advancement of its every possibility, and pride in the extending scope of its achievements, to earnestly urge you to consider the opportunity afforded us by this National Medical Museum and Library, seconded by the hearty good will of its managers, and, incidentally, by the medical profession, *to accumulate, preserve, and exhibit, at government expense*, ample stores of literature and museum specimens to illustrate our history, progress, and attainments, and to evidence as we can in no other way our claim to the attributes of a liberal profession. As a means to this end you are urged to consider the invitation of Dr. Billings to formally adopt this government museum and library as your own National Dental Museum and Library.

DISCUSSION.

DR. FINLEY: Mr. President, as a basis or start for the discussion, I should like to offer this motion: "That this Association formally adopts the Army Medical Museum and Library as the National Museum and Library of the dental profession of the United States."

I make this motion in order that we may put ourselves in line with the other branches of the medical profession. I understand that the American Medical Association has formally adopted this as its National Museum and Library, and also that several specialties of medicine—in fact, all the national bodies of that character—have adopted it. This has been suggested to the members of the dental profession by Dr. Billings, as is shown in a letter to Dr. Donnally, dated December 10, 1894, which is printed in the *Dental Cosmos* for June, 1895, on page 519. That is my reason for offering it.

DR. CROUSE: If I were going to adopt a child, I should want to see how expensive the operation of raising it was going to be, and I feel the same way about this proposition. I should like to know more about it before voting that this Association adopt it. It is a question whether it is a wise thing for us to do, and I should not want to do it hastily. During the reading of that paper, which was long, I did not have time to listen to it; perhaps the rest of you know about it.

I should like to have the matter referred to the Executive Committee if it is going to be a matter of large expense.

DR. PATTERSON: If one did not listen to the reading of the paper and has never visited this museum and observed the perfect manner in which all medical specialties, save our own, are there represented in the manner described by the paper, I think a visit of that kind would make him most heartily in favor of this motion. I cannot imagine what objection Dr. Crouse could have. This is the place where such a movement ought to be made, and it seems to me it should be done. If you will go there and visit the place, as I have done, I think you will come away with the same opinion.

DR. TAFT: I visited the museum about a year and a half ago, and had quite a conference with Dr. Billings. He is anxious that the dental profession should have a department in the Medical Library and Museum. He has a nucleus there of a library: a large number of volumes. He has also a nucleus for a museum, consisting of instruments and appliances pertaining to the profession, and wishes to

complete it by the collection of anything and everything that might be in any wise interesting. He is anxious that that be carried forward.

There will be no expense to the dental profession except to send or put there such things as may be thought appropriate.

The material so far collected is now in a room with other things. Dr. Billings proposes to give for the Dental Museum and Library a fire-proof room amply sufficient to contain all that may be sent, in which the material can be perfectly arranged separate from anything else. This is a very desirable thing indeed.

There may be another reason for aiding this museum and library. In the various departments there are many books and objects duplicated, and more than duplicated, two or three times over probably. These are for exchange for other things; and as there is now a most desirable interest awakening in establishing libraries and museums in our dental colleges, through this National Museum it might be possible for the colleges, by exchange, to help complete their own libraries and museums. Every inducement seems to urge our co-operation in this matter. A dental department established there would make a central point and focus for the attention of the dental profession. It would be visited with profit by any dentist wishing to consult either the library or the museum, and I can hardly conceive of any more worthy object than the establishment of this museum at Washington and its fullest equipment through the efforts of the profession at large.

Congress makes an annual appropriation of perhaps twelve thousand or fifteen thousand dollars for the support of the National Library and Museum, and Dr. Billings proposes to assign to the dental department a proper proportion of that money, to bear any expense that may be incurred.

DR. THOMAS: Mr. President, the thought occurs to me that this would be a very proper thing to do. The prospects are that we shall not collect the sum of twenty-five hundred dollars required for erecting a statue in the open air to Horace Wells, the discoverer of anesthesia. We will probably collect a sufficient sum to procure an heroic-sized bust, and the Dental Museum at Washington would be the very proper place to put it, where there could also be placed busts or tablets to the memory of other great men of our profession.

DR. TWILLEY: I wish to say there is at present a movement in the city of Baltimore to raise money for a tribute to Chapin A. Harris. I believe letters are now being circulated throughout the

country with this object in view. Before final action is taken in the matter, I think it advisable to enter into a correspondence to try and unite the profession in the effort to erect memorials to these distinguished men.

DR. DONNALLY: This matter of adopting the Army Medical Museum is *a separate, independent, and distinct question*. When we dispose of this question, I am sure that my friends and myself, who are interested in this matter, will come to the aid of these gentlemen in adopting anything of the kind they have suggested on its individual merits and separate from the matter now before you; but I beg of you, gentlemen, in the interest of the question *per se*, that nothing of this kind be brought in. You do not know what effect it may have in prejudicing our position in relation to this institution with the authorities controlling it. They are opening the doors to us. They are giving us every possible advantage with the other branches of the healing art. We do not want to suggest to them, for it is positively not true, that we have anything else in view in adopting this motion offered by Dr. Finley than the building up of this library and museum by making it our depository for all things pertaining to dentistry, past, present, and future. I predict that in a few years this collection will become the special pride of the profession, and to the perfection of which every dentist imbued with the professional spirit will lend a helping hand.

The VICE-PRESIDENT: The Chair would be inclined to the opinion that the question of a memorial to Dr. Wells or Dr. Harris is not pertinent to the question before the house.

DR. TWILLEY: The gentleman has anticipated my idea, which was to let the Wells fund and memorial be kept separate from this Washington affair, and that a separate committee be appointed for that purpose.

The VICE-PRESIDENT: The present question is not as to ways and means, but as to the fact. Shall we adopt the National Museum in Washington as our depository? Are you ready for the question?

[The question was decided in the affirmative.]

DR. DONNALLY: Now, I move that a committee of three be appointed by the Chair to co-operate with the managers of the Army Medical Museum and Library in enriching its stores of dental literature and museum specimens, and especially by appealing to dental societies and individual members of the profession for assistance. By these I mean such pathological specimens, models illustrative of

treatment, etc., and such literature as we may have duplicates of, and anything of educational value that any one would like to place there. There is no money involved in this at all. The government appropriates thirty thousand dollars a year for the maintenance of this institution; for literature, twelve thousand dollars; and Dr. Billings told me that while he has the regulation of the distribution of this money to the different departments of the Museum and Library, he actually expends about fifteen hundred or two thousand dollars a year on dental subjects. Every dental journal that amounts to anything, in every language, is taken and indexed in the Index Medicus, under subject head, and in the Index Catalogue (of which so much was said in praise in my paper), under both the author's name and the subject head, and sent to every library of any consequence in the civilized world.

I simply wish to explain, in answer to Dr. Crouse's question, that there is no expenditure of money by this Association involved in this. The only object is to bring the matter to the attention of dentists by informing them of the aims, policy, and character of the Army Medical Museum and Library through our journals, by personal appeals, by letters, by all manner of means to get them interested in this, which is one of the grandest things that we could possibly do to give us a deserved status with the medical profession and with the public at large, as well as to secure, under one roof, a permanent record of the history and condition of our profession.

[Dr. Donnally's motion was agreed to.]

REPORT OF SPECIAL COMMITTEE

On the History of the Classification of Dentists by the Census Bureau for the Eleventh Census.

TO THE PRESIDENT AND MEMBERS OF THE AMERICAN DENTAL ASSOCIATION:

Gentlemen,—Your Committee appointed to prepare a history of the classification of dentists as manufacturers by the Census Bureau for the Eleventh Census (1890), beg to report:

Your Committee tried to reach by circular letter every dental organization in the United States. One society refused to furnish the information asked for. If it is entitled to credit, it is therefore not the fault of your Committee that it is not properly reported.

The report is arranged under two heads—before and after the introduction of the Wilcox bill. The first of these has been divided into two parts—first, the origin of the movement at Baltimore, September 1, 1890; second, the protest in Philadelphia, October 20, 1890.

PART I.—THE PROTEST IN BALTIMORE.

In searching for information, we called upon Dr. Richard Grady, of Baltimore, to borrow some papers we believed he possessed. He not only had these, but many others; and he was so familiar with the details that he was asked to make a sketch of the history in Baltimore and allow the Committee to utilize it in their report:

720 NORTH HOWARD STREET,
BALTIMORE, June 15, 1895.

Dear Dr. Boice:

I herewith hand you what I have prepared, at your request, on "Dentists and the Census of 1890," together with letters and papers, all of which are at the disposal of your Committee of the American Dental Association.

Yours truly, RICHARD GRADY.

"As the question of priority has enlisted some zeal without definite settlement, I shall, in complying with your request to tell what I know of the

opposition, confine myself with all consideration and courtesy to the time previous to the Wilcox bill.

"Everything has a beginning and an end; and when I heard that success had crowned the ability and energy of the Dental Committees, June 27, 1892, nearly two years after I had first protested, the words of Solomon recurred to my memory, 'Better the end of a thing than the beginning.' Whilst the inception, in the teeth of clinched antagonism, marks an era in the history of dentistry, for the final result I accord merited credit to the Dental Committees, composed as they were of men resolutely and indignantly determined to use every means in their power to make Congress see the injustice of deposing dentists from their honorably acquired position of professional men.

"As I take it, *the date of the first recorded protest* is the central question in any statement of the case. What I published in the *Baltimore News*, under the caption, 'Are Dentists Manufacturers?' is quoted at length, as printed September 1, 1890. It is a historical fact beyond question which must never be lost sight of by your Committee appointed to 'draft a sketch of the history of dentists being classified as manufacturers by the Census Bureau of 1890:'

"*Are Dentists Manufacturers? The New Census Creating more Trouble and Vexation.*

"EDITOR OF THE NEWS:

"*Dear Sir*,—An agent of the Census Department handed me last week a blank to be filled on the ground that dental offices are 'establishments of productive industry,' and that dentists are required to furnish statistics of manufactures to the Census Bureau. I represented to him that the dental surgeon cannot properly be subjected to investigation and annoyance in respect to his professional work any more than the surgeon in other specialties of the medical art, that he stands in delicate and confidential relations to his patients, that the demand for reports from dental practitioners being novel and unjustifiable, there would be general reluctance on the part of the profession to give the information contemplated by the schedule, and that the superintendent of the census of 1880, after correspondence, determined to omit from the tabulations of the office 'dentistry in all its branches,' and had all the schedules on file indorsed to that effect and returned to their respective makers. With this explanation the agent left, and next day called and took the blank away. Subsequently he returned with it and said that he was required to obtain the information necessary to fill the blank, which the law compelled me to give.

"I am desirous to comply with every legal demand, and also to save all connected with the Census Office from trouble. The schedule demonstrates, however, that the difficulty in the way is that the specialty of dental surgery is not comprehended; otherwise it would be seen that it is unwise, if not illegal, to demand statements from dental practitioners respecting their professional doings. The word surgery denotes hand-work, in connection with the art of healing, and this whether manual or instrumental, or both conjointly. Orthopedy (medical) is the art of curing or remedying deformities in the human body. Prothesis (surgical) signifies the addition of some artificial part to the human body. Marked examples of both these classes are shown in the report of the International Exhibition (1876), edited by Gen. Francis A. Walker, chief of the Census Office in 1880; for example:

'Then followed twenty-two specimens of *prothesis* and *orthopedy*, embracing pivot teeth, dentures, complete and incomplete, with and without spiral springs, the various methods of retention by atmospheric pressure and by clasps, and a series of orthopedic apparatus for the correction of congenital malformations of the palate, and loss by scrofulous and syphilitic necrosis.'

"Of the judges of the group on medicine, surgery, and prothesis, no one was a dentist: all were in medicine and surgery, and their testimony shows that the exhibits, which embraced or represented in principle all which dentists make or use in practice, were surgical.

"The appliances made in the operating-rooms and laboratories of dentists, which the Census Office claim as 'mechanical,' are made only after examination of the patient, or of the mouth, or parts for which the appliance is needed. In some cases, teeth or other parts require removal or some additions, such as fillings, alteration in form, extraction, the removal of diseased bone, etc., and the healing of the parts. In most cases the appliance cannot be made except by the aid of casts or impressions, taken from each particular patient or person for whom the appliance is necessary, without whose co-operation the work cannot begin. When the appliance is finished it is useless and of no value except to or for that *particular patient*. These appliances are thus surgical. They are the results of diagnosis, prognosis, and hand-work combined to produce a useful result in, or appliance to or for, the human frame; this even when no medicine is given or prescribed in surgery. In filling teeth, the result of the dentist's labor is the addition of artificial parts to defective organs of the human body, this addition to each tooth of a patient being, when completed, virtually a part of that *particular person*. Filling teeth is therefore a surgical operation.

"No schedule was left with physicians and surgeons. Lawyers and other professional men were not asked to report. Why, then, should dental practitioners be called upon to give information in regard to the personal treatment of their patients? Dentistry in *all* its branches was omitted from the tabulations of the Census Office in 1880. What is the reason for including it in 1890?

RICHARD GRADY, M.D., D.D.S.

"BALTIMORE, September 1, 1890.

"The Association of Dental Surgeons of Baltimore City (incorporated) was the first dental organization to take formal action. A special meeting was called for September 12, 1890, 'to determine whether as a body the Association should resist the demand of the census officers for an account of the profits of dentists from mechanical dentistry':

"BALTIMORE, September 11, 1890.

"*Dear Doctor:*

"You are urged to be present at Dr. Volck's, 338 N. Charles Street, on Friday, September 12, at 5 P.M., to determine whether as a body the Association should resist the demand of the census officers for an account of the profits of dentists from 'mechanical' dentistry.

"By authority of the President, Dr. Volck,

"W. S. TWILLEY, Secretary Association of Dental Surgeons.

"The favorable action of the Association led the Chief Special Agent at Baltimore, within a week, to write to the Census Office, Washington. He received this answer:

"'Replying to your inquiry of September 18, 1890, referring to mechanical dentists, you are informed that the term is considered by this office to embrace all branches of the profession, except the extraction of teeth, and should be duly reported on General Schedule No. 3.'

"Having done what I could by appeals through the press, vigorous personal efforts repeated again and again, and the influence of the Association of Dental Surgeons, and realizing that the matter demanded the combined support of the dentists in the community, I enlisted the services of Dr. Wm. Shaw Twilley, active, zealous, acute, to whom I gave a copy of the letter last quoted, believing that he would command co-operation and helpfulness where I could not. He returned the letter October 1, 1890, and wrote: 'Inclosed please find the letter. I showed same to Dr. ——, and he promised to bring the matter up before "the society" of which he is a member, on Thursday evening, the result of which I think will be a call for the profession to take some action in the matter. As soon as I had explained to him the questions asked, he expressed his willingness to join in the fight and assist (*me*, not you) all he could.' Such, unhappily, is the truth of history.

"I do what seems to me right with the letter (omitting the name, however), and with another dated November 22, 1890, to be quoted later.

"October 3, 1890, the Chief Special Agent and the agent who left the blank in August, 1890, called at my office, but I was out of the city.

"October 6, 1890, I wrote the Census Special Agent regretting that I was not in when he called, and that a committee had been appointed to confer with him and, if necessary, go to Washington, to which he replied: 'I would be pleased to confer with your committee at such time as will suit their convenience, provided that it is at an early date, as I cannot allow the work to be delayed.'

"October 22, 1890, the *Baltimore Sun* contained the following respecting the definition, 'mechanical dentist':

"THE DENTISTS AND THE CENSUS.

"By Dr. RICHARD GRADY.

"The prevailing idea that the gold filling and the artificial denture are as legitimate objects of barter and contract as any other tangible object of manufacture has led the Census Office at Washington to interpret the term 'mechanical dentists to embrace all branches of the profession except the extraction of teeth.' Mercantile relations of cost and price are capable of definite adjustment when applied to commodities of known values, enhanced by labor at given rates, but professional service is amenable to no such standard. Dentistry is the science and art of medicine applied to the dental organs, and the fee is a valuation of thought and skill. The anatomy, physiology, and pathology of dentistry differ in no respect from that taught in medical schools. Dental therapeutics, however, include a class of operations not taught in medical schools and not practiced in the offices of physicians and surgeons. Hence, by universal consent, this branch of therapeutics, under the name of dental surgery, is assigned to a special class of practitioners.

"The distinguishing feature of dental therapeutics is the art of replacement,—replacement of dental *structure*, replacement of dental *organs*, which may be classified as dentistry of the chair and dentistry of the laboratory. As medicine and surgery are combined in the practice of the majority of medical men, so the two classes of prosthetic mechanism are usually practiced together, and such practice is, in a large number of cases, unavoidable. The element of mechanism and the necessity for the exercise of handcraft enter more or less into all special sciences. Astronomy, chemistry, phar-

macy, microscopic analysis, and modern medical diagnosis demand extreme accuracy of manipulation, and all great discoverers in these sciences displayed the ability not only to use, but also to invent and construct apparatus.

"The universal recognition of the great value of this element in every department of physics has given the scientific world a correct idea of the true dignity of highly educated mechanical skill,—skill without which the physician's art is crippled, surgery becomes impotent, and dentistry has no existence. No science or art except chemistry has been so eminently progressive in recent years as dentistry, and it is second in importance and extent of its usefulness to no specialty of the art of healing. It requires the talent that would make a good surgeon, the talent that would make a good mechanic, and the talent that would make a good artist.

"October 29, 1890, the Census Office having decided adverse to the dentists, saying, 'This office is strongly of the opinion . . . that such features of the profession are clearly within the limits of the census inquiry relating to productive industry, and, as such, are under the law to be included in the tables of manufactures,' I wrote again to the *Sun*, discussing the new interpretation of 'mechanical dentists,' as follows:

"THE DENTISTS AND THE CENSUS MEN.

"MESSRS. A. S. ABELL & CO.:

"The dental profession of Baltimore is certainly under obligations to the *Sun* for the interest shown by its representatives in Washington and at home in discussing 'the census and the dentists.'

"The interpretation given by Mr. Williams to the term of mechanical dentistry, namely, 'That branch of the profession which includes the manufacture of artificial dentures, such as plates, crowns, caps,' modifies that given September 23, 1890, by Chief of Division Boudinot to Chief Special Agent Creager: 'You are informed that the term is considered to embrace all branches of the profession except the extraction of teeth.' The Census Office is in error in claiming that 'at the census of 1880 . . . opposition was uniformly withdrawn when proper explanations . . . were made to the persons averse to giving the information required.'

"The facts are that the superintendent of the census of 1880, upon the representation made to him by the chief special agent of New York 'of the general reluctance of the profession to give the information contemplated by the schedule,' and upon the presentation to him of a 'protest against the novel and unjustifiable demand made for reports from dental practitioners,' determined to omit from the tabulations 'dentistry in *all* its branches.' If, as the result of this decision, all the schedules in the New York office were 'indorsed to that effect and respectfully returned to their respective makers,' where did the tenth census get the various statistical items relating to mechanical dentistry? Again, referring to the figures of that census, the number of establishments noted for Baltimore is 14, which would imply that but one in ten of 141 dentists whose names are given in the Baltimore City Directory for 1880, manufactured artificial dentures, crowns, caps, etc., whereas it is well known that such work is done by the majority of the profession.

RICHARD GRADY, M.D., D.D.S.

"Dr. E. P. Keech, of Baltimore, under date of October 29, 1890, sent a protest to the Census Office in which he says, 'Now we protest again against being classed as manufacturers. We sell nothing, nor do we make anything for sale, but render professional services as medical men who make plaster casts for fractures, etc., and introduce pessaries, etc. To class us as manufacturers and compel reports to be made will be a serious blow to the pro-

fession, and degrade it in the estimation of kindred professions and also the community at large. Already, taunts are freely passed. I will now leave this with you and beg that you will reconsider your decision.'

"The Maryland State Dental Association, on November 21, 1890, passed the following:

"'*Resolved*, That all members refuse to sign the report offered by the census enumerator, and that the sum of $200 be appropriated to defray the expenses of him of whom a test case is made.'

"It having been published from Washington that, 'where information was refused in the manner proposed by the Maryland dentists,' the penalties provided by the census law could be resorted to, and it having been hinted that I was 'a marked man' for one of the 'first victims' because of my having originated the opposition, I again sought Dr. Twilley to ascertain if there was not some covert bias or prejudice on the part of the 'powers that be;' to learn if there was any substantial reason why the action of the meeting of the Maryland State Dental Association, November 21, 1890, should not apply to me. The organization had voted that 'the sum of $200 be appropriated to defray the expenses of him of whom a test case is made.' The reply caused no surprise, and proved the accuracy of my suspicion that there would be no aid in preventing the threatened mischief from those who I had a right to expect should be the first to come to my assistance; who should have said, 'Yes, we'll stand by him; even if we can't approve all his acts, we won't desert him in his hour of trial. Tell him we believe he is more faithfully discharging his duty to the dental profession by resisting the encroachments of the Census Bureau than he would be by submitting to its unlawful authority, for he becomes not only the vindicator and defender of his own rights, but the rights of every dentist in the community, and of the well-being of the dental profession itself, because in the professions each individual assumes a trust relation to his associates, and his private ends become of secondary importance.'

"May I, without offence, ask you to consider that the special 'victim' selected by the Census Office from among those present at the meeting referred to had nothing to do with the point at issue, because it was a *thing*—the classification of dentists as manufacturers—that was being fought? I bury all remembrance of the incident, and only mention it because justice to truth demands the statement. These are Dr. Twilley's despairing words:

"BALTIMORE, November 22, 1890.

"DEAR DOCTOR:

"I have just returned from my tramp, and must confess do not feel near so good as when I started out, for then I had hopes. Now I have none. There will be no support given by one faction of the profession: of this I am quite well assured.

"Hoping all will end well, I remain truly yours,

"W. S. TWILLEY.

"December 30, 1890, it having been 'decided that the Census Office would exercise the full power of the census law in order to accomplish its object,' . . . 'that the census officials' demand for an answer to all inquiries

must be complied with,' . . . 'that those who refuse to answer the census inquiry will be strictly prosecuted;' and Mr. Williams, a special agent of the Census Office, having said to a *Sun* representative that the same questions that the Baltimore dentists object to are being put to the dentists in other cities, and 'so far we have not received a single complaint from any of them; we are receiving their replies every day,' I, not willing to let such an official statement go unchallenged, if not uncontradicted, with painful iteration, wrote to *The Sun* as follows:

"THE CENSUS AND THE DENTISTS.

"Dr. Richard Grady writes to *The Sun* respecting the decision of the Census Office that dentists who refuse to answer the census inquiry will be prosecuted. He says, 'The iteration and reiteration in Washington that the dentists of Baltimore are now, according to Mr. Williams's statement, the only ones who resist the purpose of the Census Office inquiry, prompted me to send a clipping to the editor of the *Dental Cosmos*, Philadelphia, for verification, as the Philadelphia County Dental Society had unanimously adopted resolutions instructing its members to decline to attempt the impossibility of making any returns. His reply is: 'As stated in the December *Cosmos*, the Philadelphia County Dental Society's resolutions set forth the protest of an incorporated body, which has, I am told, formally presented its protest to the authorities at Washington, and has no intention of receding from the position taken.'

"I grieve to say that just when the atmosphere of hope and courage created by the news to the Baltimore dentists that other cities were declining to make returns afforded unparalleled opportunity for success, the public press (January 14, 1891) announced from Washington that 'Baltimore dentists will answer,' and that Mr. Williams, special agent of the Census Office, 'believes this ends the entire difficulty, and that the dentists of Baltimore will no longer hesitate about furnishing the information which the Census Office demands.' What a spectacle Baltimore's strong men present! At the first shock they fall; they refuse, then hesitate, then, 'saying they would never consent, consented.' We were disappointed, but we were neither dismayed nor defeated yet. Nothing could have been more sudden, more startling, more unlooked for, than the 'understanding reached whereby it was conceded on the part of the committee',—'a committee representing the dentists of Baltimore,' is the language of Superintendent of Census Porter, which is misleading, to put the thing politely; 'that it was for the good of all concerned that dentists should furnish the information which the Census Office desired.' A feeling of depression, if not of indifference, almost insuperable, followed the division of sentiment among the Baltimore dentists and a diversion of their influence. The agreement which recited that 'the dental profession would best serve its interests by complying with the request of the Census Office in furnishing the information called for' was fiercely denounced as an abandonment of important rights. If not intentional, it was construed as certainly, in its results, a most disastrous evasion of the views of the incorporated dental organizations of the city and State which had 'resolved that all members refuse to sign the report offered by the census enumerator.'

"January 19, 1891, *The Sun* contained—

"THE DENTISTS AND THE CENSUS.

"In reference to the paper signed last week in Washington, Dr. Richard Grady said, 'The three dentists who signed the paper at the Census Office did not voice the sentiments of the incorporated bodies of the city and State,—the Association of Dental Surgeons of Baltimore City and the Maryland State Dental Association,—which have unanimously adopted resolutions declining to make returns, which resolutions have never been rescinded, and that Dr. F. L. Bassett, president of the Philadelphia County Dental Society, has written, under date of January 16, that the Society has no intention of receding from the position taken.

"'In no case that I am aware of has any member of the Society filled out a blank of the manufacturers' census since the passage of the resolution.'

"The opinion of Lawyer R. M. Venable on the liability of dentists who refuse to fill the census blanks is as follows: 'There is no penalty whatever for refusing to answer the questions; indeed, the penalty is deliberately omitted because there are constitutional doubts as to the power of Congress to exact the information. Every one is free to answer or decline to answer as he sees fit. The dentists may either ignore the whole matter, or answer generally that they do not operate manufacturing establishments.'

"After this opinion, the Baltimore Dental Club, a social 'organization,' on February 3, 1891, resolved 'that the members of the Club refuse to answer the questions concerning manufactures which were presented by the Census Bureau,' and the committee which made an agreement with the Census Office signed a letter which read: 'We gave our signature to that paper under the impression that the Census Bureau had full power and authority to enforce dentists to fill up the usual manufacturers' blank as presented to them.' . . . . 'We have now changed our opinion in reference to the matter, and demand a release from all obligations contained in said agreement.'"

PART II.—THE PROTEST IN PHILADELPHIA.

October 20, 1890, the Philadelphia County Dental Society adopted the following resolutions; at the time they did not know there had been a protest entered at Baltimore:

WHEREAS, It appears that under the census now being taken dentists are being classified with manufacturers, and being requested to fill out and return a manufacturer's blank; and

WHEREAS, Dentistry is a liberal profession and a branch of the healing art, and in no sense a manufacturing business; therefore,

Resolved, That this Society protests against such classification, and instructs its members to decline to attempt the impossibility of making any return upon such blanks.

In the discussion of these resolutions, Dr. Alonzo Boice said, "You are going into a big fight that will give you a great deal of trouble, time, and expense to carry it through successfully. It may involve

individually and collectively the necessity of a defence in court. You may expect to have the support of the profession, but in my opinion you will not receive it. As to the justness of the resolutions there can be no doubt, and the only question for us to consider is, Are we willing to stand by these resolutions?"

Dr. F. L. Bassett, President, announced that every member had voted for the resolutions, and it is now our duty to stand by them. Committee—L. Ashley Faught, Alonzo Boice.

A copy of these resolutions was sent to the Superintendent of the Eleventh Census of the United States. A reply was received, dated October 29, 1890:

"This office is in receipt of your letter of October 23, 1890, transmitting a copy of resolutions adopted by the Philadelphia County Dental Society.

"The objections urged by your association against making returns relating to the operations of the mechanical branch of the profession appear to be based upon apprehension that the inclusion, for census purposes, of statements showing the amount added to the productive industries of the city of Philadelphia by this branch of your profession might result in classifying dentists with the mechanical trades instead of with the professional classes, to which they properly belong, and by such erroneous classification to reflect injuriously upon the profession.

"In this connection I beg to advise you that this office has no such purpose in view, and dentists engaged in this branch of the profession will not be injured in any manner by furnishing the information required for census purposes.

"The term 'mechanical dentistry' is intended to mean that branch of the profession which includes the manufacture of artificial dentures, such as plates, crowns, caps, etc., which are manufactured wholly or in part outside the mouth and afterward inserted.

"This office is strongly of the opinion there can be no doubt that such features of the profession are clearly within the limits of the census inquiry relating to productive industry, and as such are, under the law, to be included in the tables of manufactures.

"At the census of 1880, the inquiry into this branch was conducted on exactly the same lines as now proposed, and the office encountered but slight opposition, and then only in isolated and individual cases, which opposition was uniformly withdrawn when proper explanations, as above, were made to the persons averse to giving the information required for census purposes. To omit at this census to consider this branch of the profession would impair the accuracy of the census of manufactures, and would prevent proper comparison between the totals of the manufactures as shown by the Tenth and Eleventh Censuses, respectively.

"The questions asked in Philadelphia are identical in every respect to those which have been propounded to dentists throughout the country, and

which are being freely and generally answered, with the single exception of the city of Baltimore, where some reluctance has, within a day or two, become manifest, *although no positive refusal has yet been made.*

"It is to be hoped that the foregoing information will result in the withdrawal of the opposition on the part of the profession in Philadelphia, thereby enabling this office, through its special agents, to procure returns from all dentists who may be engaged in the manufacture of artificial dentures, either independently or in connection with the operative branch of the profession.

"It will be readily seen that without such returns the totals relating to the productive industries in the city of Philadelphia will necessarily be defective, as compared with other cities in which these returns are made, and to this extent Philadelphia will suffer by comparison with other communities."

A reply was sent to this October 30, 1890:

"I am in receipt of your letter of October 29, 1890, and desire to submit that the action of the dental profession in Philadelphia is not any way, as you suppose, 'based upon apprehension' that any action of the Census Office can in any way result 'in classifying dentists with the mechanical trades,' but to correct once for all an egregious error of the Census Office. The profession of dentistry is a unit, so far as its operative procedure is concerned, and cannot distinguish that the manufacture of artificial dentures, crowns, or caps, are in any sense within the province of a census on manufactures, for it is done in the same way that a physician compounds a prescription, or makes contrivances for broken limbs, and is done only in individual cases and for healing purposes. If this error was perpetrated in 1880, as you now suggest, it is time for it to be corrected, and the fact of its existence then is no argument for its continuance now. We also submit that the omission 'at this census to consider this branch of the profession' would, instead of impairing 'the accuracy of the Census of Manufactures,' very largely contribute to increase its accuracy; for it is very clear that the dental supply manufacturers from whom we obtain our metals, teeth, caps, crowns, etc., will also report these articles as manufactured by them, and that our reports would simply be duplicating theirs. You write that these questions are being freely and generally answered throughout the country, with the single exception of the city of Baltimore. I may state that while, at present, we are fully aware of the position of our professional brothers in Baltimore, we did not know of their action at the time of passing our resolutions. *We believe that it is hardly possible for the profession in two such large cities, acting thus independently, to be in error*, and we think that when the census takers get actively to work in the other cities that we will not be *so exceptional* as you suggest."

An additional reply was sent November 4, 1890:

"In addition to the information sent you on the 30th ult., relative to the classification of dentists as manufacturers under the eleventh census, we desire to submit, in addition, that the profession does not object to making a return of a census as a census of the profession; that is, they are willing to give any items that you may want relating to their work, on blanks prop-

erly arranged for *professional* men. We also desire to submit, that when a physician compounds a prescription, that the compound thus manufactured has no marketable value outside of the individual for whom it is prescribed, nor has the most learned legal opinion any value outside of the case in which it is given; and in like manner artificial dentures, plates, crowns, caps, etc., have little or no intrinsic value, except to the individual for whom they are constructed. If they serve not his case, it is impossible to throw them upon the market like other manufactures, and recover value. We sincerely trust that these points will receive consideration, and that the Census Office will classify us where we belong."

On October 22, 1890, the *Philadelphia Times* contained the following editorial:

"*Dentists Don't Like It. Object to being classed in the Census as Manufacturers.*

"The dentists of this city, represented by the Philadelphia County Dental Society, are protesting vigorously against the classification of their profession under the present census rules as a manufacturing business.

"This classification was not known until the census department began the taking of the manufacturing census, since which time dentists have been asked to fill out the complicated manufacturers' return blanks.

"The matter was taken up last night by the profession at the annual meeting of the Society. After considerable heated scoring of the classification, resolutions were adopted declaring that as dentistry is a liberal profession, and essentially a healing art, and is in no sense a manufacturing business, the Society protests against such classification.

"The members of the Society were in the resolution instructed to decline to attempt the impossibility of making any return upon the blanks provided.

"The directors of the Society claim that while in some instances they do manufacturing, it is done in just the same way that a physician compounds a prescription or makes contrivances for broken limbs, and is done only in individual cases and for healing purposes."

Other papers, the *Ledger*, *Inquirer*, and *Press*, had articles on this subject. Superintendent Porter evidently did not like the tone of these articles, and sent to the *Press*,—

"Your article in to-day's *Press*, respecting the action of this office in including dentistry with manufactures, is so evidently based on misinformation that I beg to submit the following in correction:

"It is by no means the intention of the Census Office to exclude dentistry from the tabulations of the professions and to relegate it to the class of manufactures and mechanics. On the contrary, all dentists will be classified in the tables of occupations with the professional classes equally with the law, medicine, theology, and the like; yet the Census Office holds, and with good reason, that the making of artificial dentures, such as plates, crowns, and caps, which are made wholly outside the mouth and afterward inserted,

is in principle a manufacture as much as the operation of the largest factory producing the materials used in the manipulations above referred to.

"The subject was discussed at length between a committee representing the dentists of Baltimore and a special agent of the Census Office, and an understanding reached whereby it was conceded on the part of the committee that it was for the good of all concerned that dentists should furnish the information which the Census Office desired.

"This would seem to indicate that opposition to the census in respect of mechanical dentistry arises partly from a misapprehension on the part of those engaged in the profession, but more largely from the desire of the partisan press recklessly to condemn without consideration any and all things appertaining to the census."

Dr. L. Ashley Faught, Secretary of the Philadelphia County Dental Society, sent a reply which appeared in the *Press*:

"I have read, with interest and with appreciation, your editorial on Dentists and the Census, and also the letter of the Superintendent of Census in reference thereto.

"The 'misapprehension' is entirely on the part of the Census Office, for artificial dentures, when made by a dentist for individual cases in practice, are certainly erroneously classified as a manufacture, inasmuch as they have no marketable value outside of the individual for whom they are constructed, and, if they serve not his case, it is impossible to throw them upon the market and recover value. This is also true of crowns and caps made under similar conditions. Now, such is the only way a dentist manufactures (?) them. There are, however, plates, caps, and crowns, etc., for universal cases, made and sold by the manufacturers of dental supplies. Of these the Census Office may rightly take notice, but the returns should come from the dealers and not from the dentists, for it is clear that the accuracy of the 'Census of Manufactures' would be impaired by their being reported both by the party making them and by the dentist who inserts them."

A special officer of the Census Bureau called on the officers of the Philadelphia County Dental Society, and advised them that if they did not withdraw their opposition as a Society, the officers would be prosecuted.

Record of the Odontological Society of Pennsylvania.

Dr. Faught, Chairman of the Philadelphia County Dental Society, introduced the same resolutions as those passed by that Society in the Odontological Society of Pennsylvania, November 1, 1890. There was strong opposition to them, but they were adopted. On April 4, 1891, Dr. A. W. Deane asked instruction regarding the filling out of blanks presented by the Census Department relating to mechanical dentistry.

After some discussion, a motion was carried to erase the resolutions of November 1, 1890, in so much as it related to individual members, and allow each member to judge for himself.

May 2, 1891, "Dr. Faught moved to rescind the resolution of April 4, 1891, which was carried."

Members of the Philadelphia County Dental Society were the only members of the profession in the city of Philadelphia who opposed the Census Bureau. They did not receive any encouragement from other members of the profession; in fact, they were criticised for the stand they had taken and maintained. On the subject of census, as well as on all other subjects, the Philadelphia County Dental Society has been guided by the advice of its attorney, E. Clinton Rhoades, of Philadelphia.

The Wilcox Bill.

The origin and introduction of this bill were due to the opposition of the general manufacturers of the commonwealth of Pennsylvania to the methods used by the Census Office, and to this might be added the opposition of the dentists in the cities of Baltimore and Philadelphia. Mr. Wilcox introduced the following bill, No. 7696, in the House of Representatives, March 29, 1892:

A Bill amendatory of an act entitled "An act to provide for the taking of the Eleventh Census."

Be it enacted by the Senate and the House of Representatives of the United States of America in Congress assembled, That sections fifteen and seventeen of the act entitled "An act to provide for taking the Eleventh and subsequent censuses," approved March first, eighteen hundred and eighty-nine, be, and the same are hereby, amended, so that the Superintendent of Census shall be required to obtain from every incorporated and unincorporated company, firm, association, or person engaged in any productive industry, the information called for and specified in the general and special schedules heretofore approved or to be hereafter approved by the Secretary of the Interior. And every president, treasurer, secretary, agent, director, or other officer of every corporation engaged in such productive industry, and every person, firm, manager, or agent of unincorporated companies, and members of firms, associations, or individuals likewise engaged in such productive industry, from which or whom answers to any of the inquiries contained in the said schedules are herein required, who shall, if thereto requested by the Superintendent of Census, supervisor, enumerator, or special agent, or each or any of them, willfully neglect or refuse to give true and complete answers

to any inquiry or inquiries contained in the said schedules, or shall willfully give false information in respect thereto, shall be deemed guilty of a misdemeanor, and on conviction thereof shall be fined in a sum not exceeding ten thousand dollars, to which may be added imprisonment for a period not exceeding one year. And all acts or parts of acts in conflict herewith are hereby repealed.

At the annual meeting of the Maryland State Dental Association held May 9, 1892, "Dr. W. Shaw Twilley read clippings from the *Sun* and *American* papers to the effect that the Census Bureau at Washington, in order to complete its lists of manufacturers, intended to take summary action to compel Baltimore dentists to answer the questions put to them by those officials, and he therefore presented the following resolution, which was adopted:

"WHEREAS, A bill has been introduced in Congress, which provides that any person who shall neglect or refuse to give information to census officials shall be subject to a fine not exceeding $10,000, to which may be added imprisonment for a period not exceeding one year; and

"WHEREAS, The public press reports that the bill referred to will be used in the nature of thumb-screws and spiked boots to enforce replies; and further, that the dentists of Baltimore who by their refusal to answer certain questions will be the first victims of the inquisitorial machine if the bill is passed; be it

"*Resolved*, That this Association re-affirms the resolutions unanimously passed November, 1890, protesting against the action of the Census Bureau in classifying dentists as manufacturers and refusing to fill out blanks.

"*Resolved*, further, That the Chairmen of the several Standing Committees, as now constituted, be appointed to convey the sentiments of this Association to the Senators and Representatives of Maryland in Congress, and urge them to have the bill referred to amended so as to omit dentistry in all its branches from the tabulations of the Census."

The Committee appointed under these resolutions was as follows: E. Nelson, T. S. Waters, A. J. Volck, W. A. Mills, D. Genese, W. Shaw Twilley, Secretary; R. B. Winder, Chairman.

At this time the Committee of the Philadelphia County Dental Society, composed of Drs. L. Ashley Faught and Alonzo Boice, which was still at work, was represented at this meeting by Dr. L. Ashley Faught.

To further this movement, Professor Winder and Dr. Faught visited the Dental Society of the State of New York on May 11, 1892. This Society passed resolutions and appointed a Committee consist-

ing of Drs. William Jarvie, L. S. Straw, and W. C. Barrett. They made a final report on May 10, 1893.

At a meeting of the Odontological Society of Pennsylvania, held May 14, 1892, Dr. L. Ashley Faught moved a committee be appointed to join the movement to defeat the bill known as the Wilcox Bill. The following Committee was appointed: Drs. J. D. Thomas, L. Ashley Faught, and A. W. Deane.

On June 11, 1892, Dr. Faught made a verbal report of the work being done by the various Committees.

On October 8, 1892, Dr. J. D. Thomas made a final report.

At a meeting of the Central Dental Association of Northern New Jersey, held in Newark, May 16, 1892, resolutions were adopted and a Committee appointed as follows: Dr. Charles A. Meeker, Dr. A. R. Eaton, and Dr. F. C. Barlow. Dr. L. Ashley Faught was present at this meeting.

This Committee made its final report in September, 1892.

May 25, 1892, the North Carolina State Dental Society appointed a Committee consisting of one from each Congressional District in the State: First District, Dr. H. Snell; Second District, Dr. F. S. Harris; Third District, Dr. Thomas M. Hunter; Fourth District, Dr. V. E. Turner; Fifth District, Dr. J. S. Spurgeon; Sixth District, Dr. J. H. Durham; Seventh District, Dr. J. F. Griffith; Eighth District, Dr. H. V. Horton; Ninth District, Dr. J. F. Ramsay.

On July 19, 1892, at the annual meeting of the Pennsylvania State Dental Society, "President Louis Jack reported that he was requested to make a representation to the Chairman of Census Matters of the impropriety and injustice of the classification of dentists in the census of 1890." In furtherance of this desire, the following petition and protest was forwarded to Senator Eugene Hale by the officers of this Society:

PHILADELPHIA, PA., June, 1892.

HON. EUGENE HALE, SENATOR OF THE UNITED STATES, Chairman of Committee on Census Matters:

My Dear Sir:

On behalf of the State Dental Society of Pennsylvania, we, the officers of the said Society, most respectfully petition you to use your influence to restore those practicing the profession of dental surgery to the classification of the census report of 1880, to wit: "That persons following individual pursuits shall be classed together." In this classification, lawyers, physicians, dentists, druggists, preachers, teachers, etc., are so classed.

The dental profession protests against the provisions of the Wilcox Bill now before Congress, as far as it applies to its members, and against the

classification this bill gives them. As well might general surgeons or the other specialists of surgery be classified among manufacturers, since there is no distinction, either in principle or practice, that we can perceive between us and them.

Permit us to call your attention to the general statements of fact in the accompanying remonstrance contained in the various classes, 1 to 18, all and each of which is presented for your serious consideration.

In the Virginia State Dental Association, "the subject was discussed informally in open session, but no resolution was adopted."

In the National Association of Dental Faculties there was reference to it in their meeting of 1892, but no action was taken.

In the Rhode Island Dental Society, the subject of Dentists versus Census was discussed and laid upon the table.

With the Committees of the Philadelphia County Dental Society, Maryland State Dental Association, Dental Society of the State of New York, Odontological Society of Pennsylvania, Central Dental Association of Northern New Jersey, and the North Carolina State Dental Society, as a working basis, with Prof. R. B. Winder acting as chairman, Dr. J. B. Rich, of Washington, although not a member of a committee, was made Chairman at Washington, for it was desirable to have some one in Washington who could make arrangements with the House and Senate Committees for a hearing. These Committees sent out circular letters to dentists asking them to send a protest to Hon. Eugene Hale, Chairman of the Senate Committee. They also used every effort to reach individual members of the House and Senate to enlist them in a just cause.

On Saturday, June 4, 1892, the Wilcox bill passed the House.

Dr. J. B. Rich made arrangements with the Senate Committee to receive the various dental committees on June 27, 1892. There were present at this meeting Drs. R. B. Winder, W. Shaw Twilley, William A. Mills, J. D. Thomas, Charles A. Meeker, F. C. Barlow, and J. B. Rich. There were also present Drs. H. B. Noble and Williams Donnally, of Washington.

The following, which had been suggested by Dr. Boice, was submitted as an amendment to House Bill 7696:

The following amendment to be introduced directly after the period at the end of the word "year," in the twenty-seventh line in the Senate copy of H. R. Bill No. 7696, of this session of Congress, which passed the House of Representatives June 4, 1892:

"*Provided*, That nothing in this act shall be construed as authority to collect statistics from professional men, such as lawyers, physicians, and dentists, of the products for their individual clients or patients."

This amendment had a two-fold object: First, to compare the dental profession with other professions and show the injustice of the census officials in their treatment of dentists; also to procure the influence of all other professions. Second, If this amendment was accepted by the committee, it would have to go back to the House, and at this late date it would be impossible to have it returned to the Senate in time to have it acted on.

Dr. J. B. Rich was the first to speak, and his remarks were of such a character that Chairman Hale interrupted him, and asked, "How would manufacturers like to be classed with dentists?" At this time it looked as though all was lost. Dr. J. D. Thomas, with great diplomacy, said "that he would like to exchange places with several manufacturers that he knew; that the dentist, as an individual, did not by any means consider himself better than a manufacturer; but the law required more of a dentist than of a manufacturer. The dentist was compelled to be an educated man, and to have a diploma from a college by the laws of every State in the Union; while a manufacturer need not be able to write his name, yet he could be a successful manufacturer. Therefore, in the eyes of the law, the dental profession was on a larger plane than the business of manufacturing. But that was not the point of our argument; we wish to be classed where we belong."

Dr. W. Shaw Twilley then showed the impossibility and absurdity of classing dentists in the way the Census Office had been doing.

In the discussion, Superintendent Porter, seeing in advance that the prospect was that the committee would insert the amendment, said he "would see that they were not classed as manufacturers."

Dr. J. B. Rich suggested that it should be put in writing before the Senate Committee, so that there could be no misunderstanding in the future, which was done:

"The Superintendent of the Census agrees with representatives of the Dental Associations present at a meeting of the Senate Committee on the Census, to carry out the spirit and purpose of the amendment presented by the said associations at the meeting, and which appears in the paper marked 'A' hereto attached. ROBERT P. PORTER.

"June 27, 1892."

Special credit should be given to Drs. Thomas and Twilley for their efforts on this occasion.

The dental fraternity then left the Senate Committee, and went to the Cochran House and held an informal meeting. Dr. J. D. Thomas was appointed to adjust the expenses of the various Com-

mittees. They then sat down to dinner as the guests of Dr. Williams Donnally.

Such is the report of your Committee: it has of necessity been somewhat voluminous, for it is history; the history of one of the most iniquitous attempts to turn back the wheels of professional development and to degrade a noble profession; the history, too, of one of the grandest victories achieved by dentistry. The struggle for independent classification was not the work of a moment, but of years; not confined to one locality, but widely scattered. Your Committee, therefore, has found it no easy task to gather together the necessary documentary evidence, to reduce it to such shape as befits a report, and yet preserve sufficient fullness and continuity to make such report just, true, and accurate. For, as Dr. J. D. Thomas has said, "As it stands to-day, any one who reads the reports would think that 1892 was the beginning of the effort to establish the standing of the dental profession, and that Dr. John B. Rich was the man who did it; but it is as Dr. Twilley says, that two years before, in 1890, the effort was made by the Baltimore men, Drs. Twilley, Grady, and others, seconded by Drs. Boice and Faught, of Philadelphia."

It was in this matter as it is ever in the achievement of any grand movement—in the glorious hour of final victory, the halo of glory falls around those who lead the last charge, while too often the valor of those who first attack is forgotten. To these who were brave when bravery was most needed,—who stood alone, as it were, in the breach and suffered contempt, contumely, and even threatened imprisonment; who by their intrepid courage before the cause was popular made the end possible,—to these your Committee would accord their fair meed of praise and recognition.

Resolved, That this report be printed in full in the Transactions of 1895; that a copy be sent to the Connecticut State Dental Association, Dental Society of the State of New York, Central Dental Association of Northern New Jersey, Pennsylvania State Dental Society, Odontological Society of Pennsylvania, Philadelphia County Dental Society, Maryland State Dental Society, Association of Dental Surgeons (Baltimore), Washington Dental Society, North Carolina State Dental Society, Virginia State Dental Association, National Association of Dental Faculties, Rhode Island Dental Society, and Massachusetts State Dental Society.

CHAS. A. MEEKER, New Jersey.
WM. SHAW TWILLEY, Maryland.
ALONZO BOICE, Chairman, Pennsylvania.

ASBURY PARK, New Jersey, August 6, 1895.

GENERAL ADDRESS.

The Struggle for Professional Life and its Relations with Practice.

By LOUIS JACK.

MR. PRESIDENT AND FELLOWS OF THIS ASSOCIATION:

When you appointed me to address you upon the subject originally assigned for this occasion, it appeared timely and acceptable.

Since then one of your number has sustained a series of papers upon topics which have gone over much of the ground I had intended to cover. I shall therefore confine my consideration to those essential elements which should become incorporated into the life of those in the early stages of practice, and which are calculated to conduce to their attainments, to their usefulness, to their honor, and to the advancement of their personal interests.

He who has determined to enter into the practice of dentistry has commenced a course which, in many of its aspects, is attended with large and exacting responsibilities. He is to have in his keeping the preservation of an extremely essential portion of the human body, the derangements of which are as far-reaching and as fraught with general disturbance of the whole bodily economy as those of many other lesions.

Therefore he requires the mastery of the principles and sciences which are related to the practice of medicine and surgery, to which must be superadded the special knowledge of dental science and also the skill in technics and mechanics demanded to give him practical efficiency.

He must assume the same obligations as are imposed upon the general physician, and must suffer similar disqualifications, if he fails to master the knowledge, secure the requirements, and fulfill the

obligations imposed upon him, as follow as the consequence of indifferent preparation for the practice of medicine.

It follows, therefore, that those commencing the study of dentistry should appreciate the relation they hold to the community and to their chosen profession. This involves that the student must be faithful and diligent. He should keep always in view that it is a right principle to devote the strength of his mind and body to the requirements that scientific study and practical preparation impose upon every intelligent and rational mind, and that it is wrong and damaging to waste precious time in early manhood which should be devoted to study and research. The thought of personal pleasure should be kept in a subordinate place as a means of necessary recreation only.

This severe devotion should commence with the first period of the student life, so that the instruction of each day may have been prepared for and meet easy reception by study and reflection upon that which had gone before. Doubtless, the deficiencies of many after they have engaged in practice can easily be traced to the waste of time and to inattention while at school. The plans of the present system of the better colleges are intended to correct the disposition of the students to shirk duties, and to check the bad habits of overloading the mental stomach at the end of the term with a mass of indigestible pabulum which had better have been appropriated meal by meal.

The consequences of this carelessness are far-reaching. The battle-sword, which every one sooner or later must wield against that which has been called the "dragon, Fate," which lies in wait along the path of all, has been blunted.

This Fate is that limited capacity brought upon us by the inheritance of ordinary mental qualities overlaid by evils of indolence and self-indulgence combined with a possible unfavorable environment. This involves a struggle,—a struggle which every man has before him to a greater or less degree according to the peculiarities of heredity and opposition of environment. This is the battle which every young man must be prepared to meet.

As Emerson says, "Fate has its lord; limitation its limits; is different seen from above and from below, from within and from without; for though fate is immense, so is power, which is the other fact in the dual world. If fate follows and limits power, power attends and antagonizes fate."

"Every brave youth is in training to rule and ride this dragon. His science is to make weapons and wings of these passions and retarding forces."

The brightest and the most useful men of all ages have been those who have taken up this gage of battle by faithfully devoting themselves in their earlier years to throw off the leaden weight of dullness and master their mental environment.

It is not the necessity for exertion to satisfy the demands of the physical nature, to fill the stomach, to clothe the body, and to protect from rain and storm, to which all this refers, but to that higher form of struggle growing out of competition with other minds, and to that still higher one, the impulse to reach the highest state of professional life; call it ambition if you will, but better let it be that fealty which leads to the development of the fullest possibilities of scientific and professional attainments.

There is no one so environed but that he can, if he would, stem the current, and make exertion beyond what is necessary for, and of a different nature from, a mere bread and butter strife. He cannot obtain the benefits of the situation in which he finds himself, unless the strife is deeper than this. The adjustment of plant, animal, or man to his or its environment, that force which acts from within coming into harmony with the pressure from without, is really what is meant by the familiar term, "The struggle for life."

This battle for life, this struggle for professional life, is what is involved in the demands upon the student at a time when he is too immature to understand fully his place in relation to the elements about him, and it continues through early manhood and must be kept up until the end of his years. It is this constant effort which maintains the life of this and of all professions. Those who do not engage in it inevitably become inert, and those who indolently play the part of drones and suck the juices of life which others have toiled all the weary day for, must drop out. To carry through the simile, "the busy bees drive them out and they wither."

This struggle, which involves the "survival of the fittest," as we see it in nature, is not as harsh and cruel a necessity as it may appear on the surface. It is the path along which the highest development has been reached, and it is the condition upon which advancement is dependent. It is therefore a beneficence; it has worked out the highest good in the domain of nature. The same result must ensue by a similar struggle in professional life. Those who advance stimu-

late others to advance. Those who fail have their fate sealed by the deficiencies of youth, as related, or have fallen by the wayside, tempted by indulgence of sense, by love of ease, by sheer mental inertia which we call indolence.

This struggle is upon all of us; it cannot be escaped from, for whatever man needs for the building up of his powers, whatever is essential to the completeness of his existence, involves it. With animals it is for bodily sustenance; with man it is as well for mental, moral, and spiritual growth.

The great purpose of life is the development of character. This is done by the toilsome rearing of truth upon truth, and cementing them into the mental constitution. I have pointed out the necessity for this mental struggle, and have indicated some moral influences which have force as qualifying the progress of life. This brings us to the consideration of some of the deeper and hidden motive forces which enter into the development of professional standing. These may be characterized as the spirit of usefulness to mankind, loyalty to one's profession, and personal benefit.

The spirit of usefulness to man inevitably inclines toward the acquirement of knowledge and the growth of powers which increase the value of service to others, and where this motive is genuine there is no stopping place, for the reason that there is no end to progress and no tendency to stop at midway vantages. The influence of the desire to serve mankind reaches from the higher mental plane, where it imposes the necessity to acquire a store of truths and facts, down to those faculties which control the digital skill. The acquirement of knowledge and the ability to do are in the endeavor each to meet the requirements of the ultimate and fullest needs of the neighbor.

Loyalty to one's profession, the second motive force, may without impropriety be fittingly compared to patriotism. As the nation, in the protecting influence of its power and of its laws, is our "pater," so in respect of the fostering influences of its institutions and of its provisions for the care of the citizen it is also a "mater." So we are all in honoring our country fulfilling the second commandment. For to honor is to do everything which can render a good to one's country, whether of service of mind or the bodily life when this may be required. We must be ministers and soldiers as there may be need. So, in reference to our profession, each devotee owes it the service of his mind that it may grow in strength and honor, and it is the duty of each one to use this power for good, to protect it from the

injurious influences which menace its advancement. It is easily perceived that the dental profession, with its growth in science and its definite practical development, carries along with it much that is not in line with professionality, and has its standing in the light of the world much impaired by diverse and dangerous parasites.

The influence of these two motives upon the individual is always potent. They react upon the personal benefit: to speak more plainly and in line with what has gone before, the struggle to harmonize the individual power with the environment becomes easier.

He who is improved by these higher impulses casts about him a wide-spreading influence which is constantly securing a legitimate personal benefit. How much more admirable the course of such than where the selfish interest has been the ruling force.

If that which should be secondary—the personal advantage—is made the primary object, professional spirit is retarded, the individual is narrowed, his views become warped, he loses the sense of honor, and he becomes like the sponge,—growing only to absorb.

The foregoing does not appear on the surface to have much direct relation to the practice of dentistry. But is it not plain that the further elevation of dentistry and the possibilities of its practice being placed on a higher professional plane depend, first, upon the intellectual training of the younger men who are growing into it, and, secondly, upon the motive forces which animate all who engage in its work?

We will then find that the result of the struggle, which brings about "the survival of the fittest," to carry on the obligations and duties of the future, will produce a broad and general advancement of the practice of dentistry, and to the lasting and personal benefit of every honorable person engaged in the splendid and beneficent service it is to mankind.

SECTION III.

Operative Dentistry.

REPORT BY LOUIS JACK, CHAIRMAN OF THE SECTION.

AS Chairman of Section III, I have the honor to report for it as follows:

We have thought it well to present a résumé of the general advancement of operative dentistry in the past two years.

A very marked feature of this period has been the development of the application of electrical force in the practical treatment of dental caries. It is being successfully used for obtunding dentinal sensibility by cauterization, removal of caries, the formation of cavities, packing and finishing metal fillings, bleaching of teeth by cataphoresis in connection with hydrogen dioxid, and electrical osmosis for obtunding dentinal sensibility.

Whilst these operations are not all entirely new within the year, they have undergone great improvement, and have gained wide acceptance. The extended employment of electrical force for these purposes, and the great advantages attending the use, warrants us in directing attention to the indications presented by the widening acceptability of this important aid, which has been made generally available by the dynamic supply of electro-motive force, and by recent improvements in storage batteries.

The use of electro-motive force in the preparation of cavities lessens the labor, permits greater precision, because it allows lighter contact with the tissues, and is less painful to the patient.

In the packing of gold, when the electro-magnetic mallet is used, it furnishes a more convenient and constant supply of current than is given by primary batteries, and when the Bonwill mechanical mallet is employed the effect is far superior to the force given by the

treadle. These considerations make it obligatory upon those who are within reach of suitable electrical currents to install the necessary appliances to meet the requirements of the times.

When public supply of a continuous current is not available, any one may make use of the Payne chlorid accumulator, of which four cells of type E, nine plates are sufficient, charged by the Gethm's sulfate of copper batteries. See article by Dr. Stanton, vol. xiii, 1892, *International Dental Journal.*

The treatment of erosion by magnesium hydrate; the use of sulfuric acid for enlarging the orifices of pulp-canals; the filling of root-canals with salol, are new and acceptable propositions.

The removal of pulps under paralyzation by cocain and the bleaching of discolored dentine with ethereal solutions of hydrogen dioxid and with sodium dioxid have become more generally effective in consequence of the intelligent description of these procedures by various members of our profession.

With respect to the packing of gold for fillings, scarcely any novel features have been presented. We would call attention, however, to "A method of inserting gold fillings with the use of hand-burnishers," by Dr. Henry F. Libby (see *International Dental Journal*, June, 1895). There have been increasing indications of the necessity for general instruction in the methods of using gold foil non-cohesively. The complaint is given out that this mode is not practically taught in the schools. It were better that graduates should have imperfect facility in the method of packing gold by hand force than to be confined, as is too much the case, to the use of percussive force. The latter has important uses; but as an exclusive method is liable to be ineffective, and is in some conditions injurious. It would appear that the use of non-cohesive gold can be taught well only in schools which conduct manual training.

The combinations of tin and gold and amalgam beneath gold have been on the increase.

The combination of zinc phosphate with metal fillings has been widely recommended, but without sufficient caution concerning the solubility of the cement whenever the fluids of the mouth may have access to it.

We would call attention to the overwhelming increase of the employment of plastic filling-materials. Many of their formulas are very indifferent, but, through specious advertisement, are pressed into too wide an acceptance.

The increasing use of such materials raises the serious question, in view of the fact that most of the cement fillings have only a very temporary duration, whether dentistry as an art and our standing as a profession are not in danger of suffering serious decline, and, also, whether American dentistry is not falling into the conditions of practice which greatly prevail in Europe.

SECTION III.—Continued.

The Office and Eccentricities of the Dental Pulp.

PAPER BY D. D. SMITH, OF THE SECTION.

SOME months ago there was a talk made before the Odontological Society of Pennsylvania, more from a practical than a scientific standpoint, on the office of the dental pulp. In the discussion that followed, a wish was expressed that the subject-matter of that talk might be embodied in a paper to be read before the American Dental Association. In accordance with that wish, the following has been gathered up for this occasion.

It is hardly to be expected that there can be presented to a body of dentists of to-day anything specially new upon the office of the dental pulp. It is possible, however, in grouping well-known phenomena in an unaccustomed manner, to get a new view of an old subject, as we might take a picture which had hung neglected for a long time because of an unsatisfactory light, and by re-hanging so change the light thrown upon it as to make it appear like a new picture. All we can hope to do at this time, in looking at the office of the dental pulp, is to present certain phenomena and facts in new groupings, and possibly to hang the old picture in a better light. It is not the purpose of this paper to study the etiology of the teeth, or to look minutely at the different formations uniting to make up a tooth, as the enamel, dentine, and cementum ; neither is it to treat of pulp-action in the original formation of these structures. The intention is rather to speak of the part the pulp plays in the economy of tooth solidification and of the deductions therefrom. It is well known that the different formations which make up the body of the tooth receive life and nourishment from two distinct sources,—the one from the pulp, and the other from the pericementum of the root. The full apprehension of this fact and the phenomena arising from it will

greatly assist in establishing rational and substantial methods for the treatment and saving of teeth. The pulp is the central figure, the important factor of every tooth. To it is committed the care of the newly-erupted tooth, and its office work is to readjust, recalcify, consolidate, strengthen, and sustain the enamel and dentine. Observers will doubtless agree with the proposition that, as a rule, the earlier a tooth is developed the more readily it yields to decay, and the more time taken for calcification before eruption the greater the resistance to decay manifested on the part of the tooth. The young tooth being frequently erupted into environments which are most unfavorable to its preservation, there begins at once a contention between the forces acting externally to destroy it and the vital forces of the pulp to protect it from within ; and just in proportion as the pulp is able to do its office-work of nourishing, consolidating, and sustaining the exposed parts, will the crown at this period be protected from decay. Hence the emphasis that should be placed on keeping the pulps of young teeth in a condition of healthful activity.

The law of *use* governing tooth consolidation, widely known and rigidly observed among patients, would probably do more to arrest the extensive decay now prevalent, between eight and fifteen years of age, than dentistry can ever accomplish by mechanical methods.

In general terms, under *fifteen years* is the period of life when the foundation is laid for the character, good or bad, of the denture. Too much importance has been and is attached to *inheritance* as determining the character of the teeth. Standing in advance of inheritance, for children, is *use* of the teeth in mastication. Natural and healthful mastication will alone force that exercise of the teeth, required by the pulp and the peridentium ; and it is the true cleanser of the mouth and teeth. The more thorough this function, the less the necessity for dentifrices and brushes.

The sixth-year or first permanent molar, erupting at an age when little thought or care is given to the teeth, is commonly the one over which the hardest battle for preservation is fought. The *importance* of saving these teeth has practically ceased to be a subject for discussion. The effort should be to save them, but with living pulps.

Devitalization of the pulp at an early period of life carries with it a more or less rapid retrogressive change in the quality of tooth-material, and that without power to arrest it. Fillings may prolong the existence of the tooth as such, but with the arrest of vitality in the pulp there is cessation of all vital sustaining action, which hitherto

assisted in its preservation; and not only so, but the imperfectly calcified enamel and dentine already built into the tooth is now in contact with devitalized connective tissue, which, in the imperfectly consolidated tooth, becomes itself probably a source of disintegration and assists in its destruction. What has been said of the sixth-year molar may also be said of all other of the young permanent teeth. The pulp being to the erupted tooth, whether temporary or permanent, the only source of life, of sustenance, and of reforming changes, it is of the first importance that it be maintained in a condition of health; and as this condition surely exists only when the pulp is protected in its own natural and proper covering, the dentine, all encroachments upon it through decay or manipulation should be carefully guarded. Its preservation in full activity means the deposition of new and better material, although parts of the crown may have been cut away or destroyed by decay.

It has been said that the pulp is the only medium through which the enamel and dentine of an erupted tooth are compacted, consolidated, and changed into decay-resisting material. While thus defining pulp-action in this paper, the author would suggest that it seems more than probable that the future may discover that the action of the pulp is not confined to enamel and dentine alone, but that it extends a consolidating influence into the territory of the cementum, inciting in it changes whereby the true bone, which covers the root in the young tooth, is converted into a tissue resembling dentine more than cementum.

Isolated instances of the action of the pulp, in re-arranging, depositing, and solidifying the materials of the dentine and enamel of a young tooth, are in the minds of all men of experience and observation, but are we not prone to think of such instances as exceptional or as anomalous rather than as the true expressions of the law of pulp-action? Are not our literature and the teachings of the past and present wanting, in that a position of supreme importance is given to operations on the externals of the tooth, while overlooking the significant aid of that living factor within the walls of the pulp-cavity? And would it not be more in harmony with the true science of tooth-saving to emphasize the matter and the manner of *pulp-protection* in young life?

There is another question upon which dental literature and, so far as we know, dental teachings are silent. It is this: Does there ever come to a tooth a period when its pulp, with all this importance attach-

ing to it in early life, can be dispensed with? It is the contention of this paper that a pulp which has maintained a healthful existence in a tooth to a period of perhaps twenty-five or thirty-five years of age has accomplished for that tooth all that it will or can do in the way of consolidating, strengthening, and solidifying its osseous structures. The maximum of density is reached, we may say, with full maturity. From this time the pulp forms a part of the tooth which can be readily dispensed with. It has done its work, often much better than it was feared it would. If it remains within the tooth, there is an unmistakable restriction of its function and a limiting of its activities, and sometimes there seems to be mischievous interference with the usefulness of the tooth. Having completed its office work of consolidating the structures it was set specially to guard, it will sometimes begin to build in upon itself, circumscribing its boundaries, or to deposit nodules of enamel or dentine, pulp-stones, sometimes ossifying the whole coronal portion, and sometimes even sending out notice of the mummifying of its entire substance by ejecting into the tubuli and the connective tissue of enamel and dentine an offensive coloring matter, which baffles all efforts for its removal. But this is not all. Later in life do we not find teeth which have been decay-resisting for fifty or sixty years, seemingly changing in structure, assuming apparently a state of partial decalcification, returning again to conditions of childhood, as evidenced by their yielding more readily to decay? Continuing on a little farther, a few years more perhaps, it is not uncommon to find that decay has become extensive throughout the remaining teeth.

Along the gum-margin, particularly of the front teeth, where fillings have preserved the teeth for twenty years perhaps, around these fillings the teeth are beginning to break down,—and if we cut into these teeth now, we find a change in the structure, a change that is not imaginary; it is real. The tooth has softened; if refilled with gold, in a comparatively short time it begins to darken around the fillings. The very best that can be done with our metallics, they will no longer arrest decay as they had previously done. Now what has brought about this change? Is it not the living organism, the pulp that previously built and consolidated the osseous structures of the crown? The same pulp, after a period of practical inactivity, is again at work, but it is now transforming the compact material which it placed in that tooth into a condition wherein it yields much more readily to decay. Now, what are the practical deductions from this

action of the pulp? Suppose we take a tooth at the period of life when it is at its best, when the dentine and enamel are well and strongly consolidated, and destroy the pulp, what will be the result? One result certainly must follow. By no vital process can there be, later in life, any change of the compacted materials of the dentine and enamel into any better or poorer formations. As the tooth is when the pulp is destroyed, so it must remain, except as to those changes which take place through the gradual disintegration of the internal structures of all pulpless teeth. Have we injured the tooth in any material degree? What is the prognosis of a tooth with pulp destroyed at the period of maximum consolidation? With present methods of treatment, who would venture the prediction that a pulpless tooth would not continue in service to the end?

If, now, the pulp is so important at one period of life and of so little importance at another,—if it is, indeed, a builder in early life and may be a source of disintegration in old age,—shall we not revise our estimates of the value of the dental pulp? and does it not open up possibilities for service, both in teaching and operating, in fields hitherto uncultivated?

One other point this paper would simply hint at, with a view of opening it up for investigation and discussion. It has been said that the future may demonstrate as a fact, what is yet but conjecture, that the action of the pulp in rebuilding the osseous structures of the tooth is not confined in its operations to dentine and enamel, but that it extends an influence more or less potent into the territory of the cementum, depriving it in some of its parts of much of the characteristics of bone-structure. If, now, this be so, there comes at least a suggestion respecting some of the unexplained manifestations of pyorrhea alveolaris. In this connection our first remark is: Pyorrhea is seldom or never found in connection with young teeth; it seems to be emphatically a disease of adult life, generally of middle life. Second: It is an affection not found in connection with soft teeth, nor in mouths with teeth much given to decay. So true is this, that in typical cases of pyorrhea it may be said there is no decay in the teeth. Third: It is never found in connection with devitalized teeth, where devitalization preceded the manifestation of the disease. In a mouth with extensive and uncontrollable pyorrhea it will be noted that the disease is confined to the strong, well-formed teeth, exempt from decay (not necessarily unfilled), but with living pulps.

Our deductions are: If it should hereafter be found that the pulp sends a consolidating tendency or influence into the territory of the cementum, rendering it obnoxious to the pericementum, because of too great consolidation, there will be formed favorable conditions for the beginning of pyorrhea, and we shall find in it the probable solution of the exemption of pulpless teeth from this disease,—why young teeth are not affected, and why pyorrhea is pre-eminently a disease associated with the hard, strong teeth of adult life.

It is of vital importance that the cementum should be kept unimpaired and unchanged. The preservation of the pulp in a mature, well-calcified tooth is not a matter of so much concern, for whatever the conditions of the crown, *it* can be restored if the cemental structures of the root are in normal condition. But a tooth which has lost its support, through absorption of process and withdrawal of peridentium, can never be restored to usefulness.

From the foregoing we must conclude that the dental pulp is an organ of the greatest importance up to the period of full tooth-consolidation. After that, for a considerable period, as it would seem, it is of little service to the tooth, and, later in life, it may even become a source of injury and trouble.

Of the gentlemen who have written of pyorrhea, no two seem to agree as to its etiology or methods of treatment. Age has not been regarded as a factor of any importance in connection with it. I do not remember that character or quality of the tooth-material has ever been considered as having any bearing on its origin or prognosis. It has been treated of as a disease of local or constitutional origin according to the views of the writer, the inference being that it may occur in the mouth of the child of twelve or fifteen years as in the adult of thirty to forty-five; but from the foregoing it would seem that investigations must extend to embrace age, tooth-structure, and pulp-action, as well as local irritants and constitutional vice, before it can be said that the origin of this troublesome concomitant of dental practice is satisfactorily defined.

SECTION III.—Continued.

The Necessity of, and Methods for, Better Pulp-Protection in Filling Teeth.

PAPER BY J. D. PATTERSON, OF THE SECTION.

IN considering this subject, no reference will be made to pulps which have become exposed or in a pathological condition from near exposure, but to fairly deep-seated cavities in the teeth of patients under twenty-five years of age, which are usually filled with the prevailing materials without any endeavor to prevent pulp-irritation, the operator believing that no considerable trouble will be possible either from the presence of a filling with the property of conducting thermal changes, or from the irritant nature of other filling-materials in common use.

In this class of cases, every observant practitioner has had his attention directed to the number of severe pathological conditions arising in after-years from death of the pulp. The extreme difficulty of controlling the inflammatory processes when they finally are set up where the pulp has long been dead and dormant is well known to all. Where there is immediate or soon-occurring trouble after a filling is inserted upon a nearly exposed or pathological pulp, the removal of the filling and usual treatment is followed by immediate cure; but where the pulp death comes from long-continued, generally imperceptible irritation, the danger is greater. The patient's attention has not been called to the tooth until after months, or it may be years, have elapsed; and when from an anemic or diseased constitutional condition the dead remains of pulp-tissue overcome the healthy function of the parts, the operator, be he as wise and skillful in treatment as any, must often fold his hands, utterly unable to abate the alarming and rapid process of destruction.

I will now attempt to make a diagnosis of these cases and show why they are so difficult to control.

When the irritation to the pulp is slight, as it must be when it penetrates through a wall of dentine, the pulp responds without noticeable pain. The odontoblasts are excited to renewed activity, the pulp-calcification proceeds slowly, and the patient is not warned of trouble. Eventually a portion of the pulp is deprived of function, and the process of destruction has begun which in the end results in the total obliteration of pulp-contents. If the putrid pulp-contents are rapidly forced through the apical opening, the result is an immediate abscess; but in the slower process, from slight irritation and gradual disorganization, the poisonous matter infiltrates into surrounding tissue in small quantities and intermittently. Nature, with its wonderful facility for destroying invading poisons, takes care of and destroys pathogenic bacteria and absorbs the detritus when it comes in small quantities. In this process, however, the investing tissues become weakened. The repair tissue which succeeds even slight inflammation is never strong, and is predisposed to subsequent disease.

Weekly or monthly, putrescent pulp-matter again comes from the apical opening and seeks new tissue to poison.

Pathologists know well that an abscess voiding intermittently will seek new points of outlet, following more easily the healthy tissue than it will cicatrized territory. In this way, each fresh invasion of pus will prejudice new territory, until repetition after repetition of the process has placed surrounding alveolar process and periosteal tissue, often to a distant point, in a weak and predisposed condition. The antitoxic proteids of the leucocytes are used up. The inflammatory products can no longer be removed by the absorbents, and with, or perhaps without, an anemic constitutional condition or an unusual amount of pathogenic matter and gases issuing from the dead pulp, a severe and rapid inflammation ensues. There is now no power left in the tissues to withstand the attack, and at times great loss of process and teeth supervenes through rapid inflammation and necrosis.

I here show you two cases illustrating. That marked No. 1 shows the loss of five teeth and the surrounding process in the mouth of a young lady, aged twenty, from the death of a pulp under a gold filling in the lateral incisor. The filling was inserted thirteen months before the inflammation began. Some irritation through thermal changes was felt after the insertion of the filling, which soon subsided. When I first saw the case, only four days after the inflammation began, the lateral, central, and two bicuspids could be removed

with the thumb and finger, and they were at once removed, as the process in the vicinity of these teeth was stripped of periosteum. When trouble first showed, the lateral was drilled into and mummified pulp-remnants were found. Vast quantities of pus followed rapid swelling. This had been evacuated with the lance, and came readily from around the teeth. Before I was consulted in regard to the case, and after, the most strict, thorough, and persistent surgical treatment was instituted, but without avail. The cuspid was left at first on account of a desire to retain it for support to a bridge, but it became very loose and an irritant, and was removed the sixth day after the beginning of inflammation. After the extraction of the teeth the inflammation abated somewhat, and after three days more the process—piece after piece—sequestered and was removed. All of this resulting from a small gold filling in the lateral which did not approach the pulp half-way through the dentine.

Case No. 2 is so exactly similar that a separate history need not be written about it save that the death of the pulp resulted from a cement filling inserted in the central incisor by myself seven years before. In this case, a young man of twenty-one, the inflammation was more rapid and the destruction greater.

In both these cases, physicians were at once called and the most approved specific and tonic systemic treatment was given. Patient No. 2, as well as No. 1, under the closest inquiry into family history, were free from hereditary taint.

When such cases as these result (and I find upon inquiry they are frequently met with) from the filling usually placed in the teeth of young people, and in not deep-seated cavities, are we not justified in calling attention to the "necessity of pulp-protection," in order that we may not incur just censure?

The diagnosis I have given you in regard to the etiology of the unusual virulence of disease in these cases I submit is a rational one, and one which holds strictly within pathological law. It now remains to inquire if there is a method by which such results may be prevented.

For pulp-protection a variety of methods and materials have been adopted,—gutta-percha, oxychlorid of zinc, oxyphosphate of zinc, asbestos, disks of quill, tin, and other materials gummed or cemented to place with Canada balsam or other mastic, adhesive plaster, etc. From this list we may as well banish the oxychlorid and oxyphosphate cements, for their irritating quality destroys the pulp in young teeth quite as often as cohesive gold does through thermal changes.

The various disks gummed to place are not suitable save in certain cases where the decayed tooth is accessible and plenty of cavity depth is present, and they are wholly unsuited as a foundation for gold. Gutta-percha, of all the materials used, easily stands in first place. However, it also cannot readily be used save in deep cavities where there is room for a good layer of cement over it upon which to condense gold.

I now come to speak of non-cohesive gold, which in my practice is used for pulp-protection almost to the exclusion of all other materials. Those who have been in practice many years cannot fail to have noted that old-time non-cohesive gold fillings which forty years ago were in universal use, upon removal for various causes, were often found placed over pulps which were protected only by an extremely thin layer of dentine, and in this position had not caused any uneasiness from thermal changes. In these cases, if cohesive gold was used in refilling, the pulp was at once affected by hot and cold liquids and by cold air, often resulting in pulp-destruction. Indeed, so far as I can remember, the bugbear of thermal changes came in with cohesive gold and the mallet, which makes a mass with the conductivity of molten gold.

The philosophy of this difference in conducting power between the two forms of gold is not, I think, difficult to trace. The non-cohesive filling is in no way a cohesive mass, cannot be welded together; and when a cavity is filled with layer after layer of this gold, the thermal shock is conducted along the layers and not down to the bottom of the cavity, for there is no intimate connection between the different particles of the different sheets. I have thus been made to believe that in this material we have an admirable pulp-protector. A pad of sufficient thickness, made by doubling strips upon each other and burnished over the pulp, has in my hands secured the best of results. It is everywhere applicable, and the filling is easily finished with cohesive gold, amalgam, or cement, as desired. If, when you are annoyed with the effects of heat and cold in a cohesive gold filling you have recently inserted,—and who is not,—you will remove such filling and without further treatment place over the pulp a pad of non-cohesive gold as here described, I can assure you that the trouble will at once disappear, and that afterward you will protect all deep-seated cavities in young teeth—or in all teeth if decay attains near the pulp—in this manner.

In concluding, I have only to apologize for asserting this non-con-

ducting property of non-cohesive foil without bringing before you more positive proof, which can be secured by scientific experiments with such an instrument as that with which Dr. C. Edmund Kells, of New Orleans, some years since tested the conducting properties of the various filling-materials. This work will be taken up later and the results made known to the profession.

DISCUSSION.

DR. FRIEDRICHS: I wish only to refer to the first paper read. I understood from that paper that a dead tooth has longer endurance or is better preserved after the pulp is destroyed than a tooth which has the pulp alive. That certainly does not coincide with my experience. My experience in a forty-three or forty-four years' observation and practice is that the moment the pulp is destroyed, the tooth is limited in regard to its duration. Also by observation I know that when the pulp is allowed to remain, the tooth will endure until worn down to the gum. Certainly God Almighty intended that our teeth should last us as long as we live, and we have plenty of cases, where there is perfect organization and health of tooth-structure, where people carry their teeth to the grave with them. Therefore, I cannot indorse that statement of the paper.

In the next place, he cites certain cases of pyorrhea alveolaris. I cannot see where the pulp has any connection whatever with that. If such is the case, why do you find the disease in mouths where only one tooth is affected and no other? If that tooth is extracted, the chances are ten to one that no more pyorrhea will be developed. Such cases have occurred to me in my own practice. If the pulp really was the cause, or would induce this condition, why everybody would be affected with pyorrhea alveolaris. Do you find that the case? I know you will bear me out in the statement that you do not. When the pulp is irritated, the usual trouble is the reflex to the pericementum. The next step is, if the congestion continues, pus is formed, and the pulp is annihilated.

There is another point; that is, there are two periods of the diseases of the teeth,—in youth, and a period of the diseases of the teeth in old age, or senile decay, with which the function of the pulp has comparatively nothing to do; but I will say with our friend, the late Dr. Atkinson, that when senile decay sets in, it is want of proper nourishment generally, and, of course, the tooth and the pulp suffer as well as the rest of the body under those conditions.

DR. MCKELLOPS: Mr. President, I think it is a pity that with the organization we have here, the very subject in which every man in this room is interested should be let go by without being discussed. There are a great many young men who come here, and they want to hear the older men express themselves in relation to this matter. These papers that have been read by Dr. Jack and the two other gentlemen are very important, and they certainly ought not to go by without discussion.

My friend here alluded to teaching our children in the public schools. More than half—yes, you may say more than two-thirds—of the children that go to the public schools in large cities are the children of rich families, who are able to take care of and do everything for the child that can be done. They are not the poor class of children that he represents them to be. No man can go around in our cities and visit these schools without being convinced of this.

Now, the saving of the pulp is a very important matter. In the case of a young child, having a small decay in the sixth-year molar, you never should put in a gold filling. It is the most difficult thing in the world. You must get the confidence of the children and learn to handle them so that you can accomplish the greatest good, and you cannot do it by putting in amalgam or gold; but if you carefully put in an oxyphosphate filling, and watch the tooth year after year, renewing the filling when necessary until the child is fourteen years old, you will find the tooth perfectly preserved, and it can then be permanently filled with gold or gold and platinum. Now I want you gentlemen to try this gold and platinum. We hear very little of it. There is not any increase in that kind of work. There is no more of that platinum and gold sold than there was years ago; but there is no better material which a man, who is skilled in his work, can use. In the hands of such a man that material can be made to surpass any inlay that was ever put in. The color of the teeth can be so closely matched that it will be hardly possible at a short distance to notice the difference between the filled and the natural tooth.

Referring to the cases illustrated by the plates, there must have been syphilis or other serious diseases lurking in the systems to produce such results.

Speaking of sensitive teeth, which were referred to in the paper, I used cylinder fillings more than forty years ago.

When I see a lack of interest in a subject like this it makes me tired and sick, and I think I will stay at home hereafter. We have

the brains and the intelligence and as bright minds as any society in the world, and older men ought not to permit such opportunities for the young men to learn from their experience in these matters to go by unimproved.

We know as a person begins to get old the pulp recedes, but that is not a source of danger. In ninety per cent. of these troubles the difficulty is caused by the secretions of the mouth.

In treating cases such as have been referred to in the paper, if you place a little iodoform and glycerin over the pulp, covering that with asbestos paper and that again with oxyphosphate, after it has thoroughly set you can put in a filling of gold, no matter of what kind, and it will never cause any irritation. I got that prescription from an old friend of mine, Will Taft, of Cincinnati.

Now I hope, gentlemen, you will not let this subject go by without discussing it.

DR. TAFT: We want to see our friend Dr. McKellops here in the future, and so I will say a few words in the hope that we may hold him, and have him come again, and many times.

I simply want to emphasize a few thoughts that were expressed by the writer of the first paper, in regard to the function and value of the pulps of teeth. The position he takes in regard to the use of this organ is correct, as every one knows, or ought to know, so far as the teeth of young persons are concerned, at least. During the time of growth, development, and perfection of the tooth, until its maturity, the pulp is a necessity. The tooth derives its nutrient supply in the main from this source, and its development and growth cannot take place without this organ. How about it after this period? Is it of any value after this? Were it of no value in the economy, nature would have made provision for its removal, as is done elsewhere. But does the tooth need no nutrition after twenty-five years of age, after it has become entirely formed? Can any one decide in any given case when the period of perfect calcification is reached? It is reached earlier in some cases than in others. It is a fact patent to every close observer, that the teeth in many instances do not seem to be complete in their calcification at twenty to thirty years of age. How do we know? Up to this time they have remained in a comparatively defective condition, but they become more and more dense after this time. This is a matter of frequent observation. But does that increased solidification take place after the pulp is destroyed? Never. What are the constituents of dentine and enamel? Two gen-

eral classes, organic and inorganic, vital and non-vital, the vital just as important an element as the non-vital. The vital must have support, must have nutrition. When its life is destroyed, its source of support is cut off, a process of deterioration begins at once; not in the broad sense,—manifest disintegration,—at once, though that comes by and by; but deterioration begins. Every close observer, I think, will find that after the pulp is devitalized, in many instances disintegration and breaking down of the tooth takes place without the ordinary obvious process of decay, simply by a deterioration of the tooth-structure, which operates upon the organic material and not perhaps upon the inorganic. So that we find a portion of a devitalized tooth may be readily broken off. This is especially true of the enamel, which after two or three years more readily disintegrates wherever a thin edge is left; or even when there is not a thin edge, it is very liable to break away because of its weakened condition, its nutrient supply being cut off.

Now, if that is true in regard to the enamel, it is much more true in regard to the dentine, because that has within it a much larger proportion of organic material. I remember the case of an excellent tooth, a first permanent molar—is it not just as easy to say first permanent molar as six-year molar? This tooth by decay had lost its pulp, and had a large cavity running through from front to back. Upon that tooth Dr. Atkinson operated many years ago, filling the pulp-chamber and root-canals and large cavities of decay, one upon the posterior and one upon the anterior surface. His statement after it was filled was that that tooth would last the lifetime of the patient. Did it? No. It had been a firm and solid tooth. Its neighbors, which all remained, were firm and solid teeth of the best class. That tooth did good service for eighteen years, except that twelve or thirteen years before this the edges of the enamel began to fret off and break away. About eighteen years after the tooth was filled, the whole inner wall simply broke down without any special accident. An examination of that tooth revealed the fact that there was not the ordinary decay. It was not wholly decalcified,—very slightly, indeed, but there had been such impairment of the organic portion of the structure that it was no longer able to withstand the force that was brought to bear upon it in mastication. The filling remained, and it was used. Within a year afterward the other side broke off, presenting the same conditions. No decay had occurred about this filling, but the sides of the tooth broke off, showing clearly that there

was a loss of strength of the structure of the tooth that was fatal to it, though it occurred after a long period. But very frequently we find these teeth disintegrating and falling away in a little while.

I was glad to hear the writer refer to the care of the teeth, and especially to the matter of mastication. Now, I have no doubt it is in the mind of every one, "Oh, this is a very simple thing. We all know how to chew, and all know how to use our teeth." It is not true that we do it. If we do know, we sin against light and knowledge. It would be better to say you do not know. I have said frequently to dentists, "How much do you do in the way of urging upon your patients the importance and the necessity that the teeth be maintained in the best possible condition for proper use in mastication?" One man says, "Why, I never spoke to a patient about that. I suppose they know how to masticate food;" and very rarely have I had one reply,—dentists, you understand,—very rarely have I had one say that he gave any special information or urged his patients to thoroughly masticate their food. It is not only mastication, but it is thorough insalivation that is required as well. It will be found, upon observation, that those persons who use their teeth to most thoroughly masticate the food have the best teeth. They have the least dyspepsia. They have the best nourished tissues throughout the body. They are better able to withstand the attacks of disease of all sorts than those who do not masticate. I know from observation that a great many people—and I believe the far larger proportion—do not masticate their food as they ought. Since being in this city, I have noticed a number of dentists masticating their food. This is a subject to which I give some attention. It is so important, in my estimation, that I cannot avoid observing it, and especially do I observe how dentists use their teeth. When the food is not properly masticated, the teeth do not have healthy exercise. Under such conditions, the teeth and the parts about them become more or less diseased. With proper mastication, the gums would be in a better state of health and condition, and the attachments to their sockets would be far better. I believe that if the dentist can impress upon his patient the importance and the necessity of thorough mastication, and if by that means the habit of proper mastication can be induced, he has done one of the greatest services that is within his power. It is a prophylactic course, it is hygiene of the mouth and teeth, and it is for the general welfare of the entire organism as well as the teeth of the patient.

It is important that this teaching be commenced, and the practice be established with the child, even before it has permanent teeth. The mother or father or nurse, anybody who can induce the child at from three to six years of age to accomplish thorough mastication, has done great good for that child. If the habit can be established then, it will remain through life, and it will avert many of the disasters that otherwise are so liable to occur.

DR. TRUMAN: The discussion seems to have lost sight of the important point, to my mind, which Dr. Smith endeavored to bring forward before this Association. If it be true, it is an important point. I am not prepared to believe that it is true, but I think that the discussion ought to lead in that direction. If I understood the paper, his statement was that the pulp from early life passed on to old age, and eventually it degenerated; that resorption took place in old age in all teeth. Now, if this be a fact, it is important; but I do not believe it, and I think all the evidence that we have had in the past shows that there is a gradually increasing density of the teeth up to the time that they are lost in old age; that there never comes a time when there is resorption. If I understand Dr. Black's record of recent investigations, this has been demonstrated to be an actual fact. It has been theoretical heretofore; but if I understand him, there is a gradual increase in density as long as life lasts, and I should very much like to hear him on that point. I know very well from my own observation, microscopical and otherwise, that there is an increase in density. I know of no time in the history of teeth in which there is a resorption. I know very well, also, that there is a pathological condition sometimes apparent, as was very evident recently in a case in Philadelphia, where the pulp exhibited resorptive power and gradually destroyed the dentine. But that is not what we are talking about. It is a very different thing from what Dr. Smith wanted to bring before this body. That is all I desire to say on that subject. It is not scientific to dogmatize on any of these matters. We want facts, and I think our friend Dr. Black can give them to us.

DR. BLACK: Mr. President, I can say a few words on this subject if it is desired, and I should be rather glad to say a few words. The exact figures in regard to this matter any of you can study in the May *Dental Cosmos* of this year. It is a pretty long study, and will require some time to work this out from the figures so as to get a clear view of it. It is a fact that the teeth become more dense, that their specific gravity becomes greater, from youth to old age. But,

gentlemen, this difference is not large. It is a difference that requires the finest and most sensitive balances to demonstrate. The increase in strength is not very great. The differences between teeth are not very great, but they are certain. Take the teeth of the child, and we find an average density. Take the teeth of the child before its teens, and then in the teens, and on up to twenty : we find in that period the greatest increase in density. Then up to thirty there is a slower increase. Then from thirty to forty or forty-five the increase is very slight indeed. Then from forty-five to sixty the increase in density is greater again. This is the way in which this has developed itself in my experimental work. I understand that Tomes is now repeating this work, and I shall expect that he will practically substantiate these results. Not precisely. No two sets of teeth taken from two sets of one hundred persons will give just the same results, and it will require that it shall be repeated upon teeth from as many as one hundred persons to give a really good demonstration. The differences in the density of the teeth of the same person are almost as great as the differences in the density of the teeth of one hundred persons. There is a wonderful uniformity in the density of the human teeth.

The pulp has been spoken of, and the influence of the pulp. Of course, the moment the pulp is dead this increase in density stops. This increase of density occurring in old age or in persons past middle age, shows very plainly that the teeth require nutrition throughout life.

Another thing in connection with this : In teeth that are worn down, where the enamel is worn away from the occlusal surfaces, where the pulp has receded, when this recession is considerable, I have found the strength of the dentine impaired, and that the impairment is in proportion to the recession of the pulp. That very wearing away of the teeth that we have come to regard as normal produces an abnormal condition of the tissues of the dentine. The dentine has lost its vitality in many of these cases. Fluids are admitted to the dentinal tubes, and the tissue becomes impaired and its strength is gradually lost ; in teeth that are perfectly sound, mind you. This was very clearly established by the dynamometer experiments. Wherever we have a tooth that has lost its pulp, the vitality of the dentine is gone, and the tooth begins to show a darker color ; there we find again that the strength of the dentine is impaired. It may weigh out all right ; but when we come to test its strength with

the dynamometer, we find its strength impaired ; and along with this impairment of strength we find a peculiar disposition of the enamel to chip off from the dentine. It parts readily from the dentine, and is much more liable to be broken away, as my friend Dr. Taft has said. It parts from the dentine, whereas in a tooth that has its pulp and its proper nutrition this ready parting from the dentine is not observed.

Now, these differences become very marked in this class of experimental work, all of which goes to show the value of the dental pulp, not simply in youth, but throughout life. The breaking away that Professor Taft has spoken of, and the causes of that breaking away, seem to be well shown in this class of experimentation. Gentlemen, the pulp is important ; not only in youth, but continually thereafter as the person grows older. Its importance is perhaps somewhat diminished, but it is still important. And it seems to me, after going over this class of experimentation with a great deal of care, that if we can do anything to prevent the wearing down of the teeth of our patients, it becomes our duty to do it. Often we can build up here and there with the platinum and gold that our friend McKellops has spoken of, being careful to anneal it thoroughly and mallet it strongly, and we can make it much harder than hammered cast gold. We can do it, gentlemen, as you will see when you get the next papers on the subject of gold. We can make it stronger than that gold that we put through our rolling-mills, so it will bear more stress, if we will give proper attention to the manipulation and building of such fillings. In this way we can protect teeth from wear.

I do not know whether it is exactly within the subject under discussion, but I want to say a word or two about pulpless teeth, the effects upon the dentine of the exposure of the pulp-chamber to the fluids of the mouth. I want to say this, if I do not follow it any further, that whenever we admit the fluids of the mouth to a pulp-chamber for twenty-four hours, we have injured the strength of that tooth for all time. It is now well known that when a pulp must be removed, if it is removed by a direct operation by the dentist, and the fluids of the mouth are never admitted to the pulp-chamber at all, that the color of the tooth is maintained, provided the filling is a perfect one. And let me say right here that it is far more important that the filling be perfect in a pulpless tooth than in a tooth that has a living pulp. The deterioration and weakening of the dentine seem to be in some way connected with the admission of the fluids of the mouth to the dentine. The discoloration is dependent upon that,

and wherever we get discoloration, I have found the weakened condition of the tissues. But wherever the tooth is bright, we find its strength good. It is a mistake to suppose that bright teeth are weak teeth. They are the strongest teeth. Hence during treatment the greatest care should be exercised, not only that alveolar abscess may be prevented from occurring afterward, but also to preserve the strength and color of the tissues of the tooth.

DR. TAFT: May we not be led astray by the remark of Professor Black when he says that when a tooth receives the fluids of the mouth it becomes or is liable to become changed in color and is weakened, but that while it retains its color it retains its strength? I do not think he intended to say that it retains the strength it would have had if the pulp had remained alive in the tooth. There is a deterioration in every case after the pulp is destroyed, but far more marked in the cases mentioned than in those teeth which retain their color. That is the objection I have to destroying the pulps of teeth.

DR. BLACK: I wish to admit what Professor Taft has just said. I will agree with him in that, but the deterioration is nothing like as great in the teeth which retain their color.

DR. TAFT: Before we proceed with the continuation of the discussion of last evening, I move that Dr. Corydon Palmer have the privilege of the floor for twenty minutes.

The motion was carried.

DR. CORYDON PALMER: Mr. President, Ladies and Gentlemen of the Association, it gives me great pleasure to be indulged with this kindness. In what I have to say, I must briefly refer to the past. I can see about me here the good ones who have gone along with me, the older ones who have been with us, and I see the new ones who have come forward, and I greet you all. I cheer you on your way. It is well known to the older members of this Association that I began early; I date back to 1839. I began with the first meeting that was held. We had our great leader. I stood by his side and helped to bring forward his fine theories and teachings, silently. I am not a speaker. I am not a writer. I have been a doer, and you can say whether I have been useful or not. What I wish to do is to show something here and to let this American Dental Association, the highest dental authority in the world, say whether it is good. Of late I have devoted my time most earnestly to the perfection of one piece of appliance. I refer to an angle appliance for a handpiece. There are a good many, and I have an admiration for them

all, and I commend them. They are good and they have their place, but there has been one kind of an angle entirely overlooked. I have endeavored through the manufacturers and others to have it produced. They say it cannot be done; that they cannot make any other angle. The one which I propose is a quarter angle. What I wish to have you think out and understand is something of about a quarter angle that is strong and large, that can take the place largely of the straight hand-piece and that can do major excavating. That is what I am endeavoring to bring forward. I have produced something which I have here. It is my first effort, and entirely my own design. No dentist or manufacturer has looked upon it, and I place it first in the hands of those whom I see before me.

Gentlemen, this is a simple thing. I do not know whether it is profitable to undertake to circulate it. But it is at your pleasure. You can see it if you want to.

Now, if you have an angle of that degree, that is larger than the No. 1 attachments, that you can hold and use freely and do almost the entire excavating with, it will be more convenient than the straight hand-piece, and that is what I have endeavored to produce. I do not say that it is perfect. It has been done under difficulties. But altogether it is not bad, and you may look at it.

Now, I have something to say in reference to burs used in the hand-pieces. You may say that I am pleading for trade, for the manufacturers, or for speculation. I am sure that this body understands that I have never put anything on sale, never entered into trade, never endeavored to make speculation or money out of what I did, but what I have had I have come forward and given freely. I gave it at Saratoga, and at Nashville, and at the Ohio college at Cincinnati. I gave it at the Old Baltimore, at the Old Pennsylvania, and throughout the West. I have given my time and services because I have a love for our profession.

I have a card here containing some burs of my own design, that have never been shown to anybody. They are such as I use every day on my case. They are made hastily, for the occasion, and I give them to you just as they are. On one half of the card are the six of my own designing and making, and on the other are samples of the ordinary burs as we get them, and then one which has been reduced to the form which I consider best. Let me say that the burs we buy from the manufacturers are faulty. They do not give us the cutting that we desire. There are examples upon this card of

the round and wheel bur, which I have prepared, to show you the difference and to have you appreciate the worth of a bur that will cut with a drawing stroke. These of mine cut with a drawing stroke, and they are the most useful burs that I have.

Now, I have here a drill to give the last final touches to the foramen in the root of a tooth. The drills that we have given us to follow the canals in the roots are so formed that they carry before them the devitalized and putrescent matter which the root contains. All drills for this purpose should be used in the fingers, so that your touch will tell you what you are doing. This drill will bring away the very last fragment of *débris*. I would recommend that they be made from steel which has a tough fiber. There is a great difference in steel. Some is good for making cutting-edges, but it has not a tough fiber. If we could get piano-wire that is large enough to hold, it would be preferable to use that.

Gentlemen, I do not suppose that I shall ever bring up this subject again upon which I am about to address you. I had a hearing at the Congress, by request, and I want to mention it here, and then I shall say no more about it. I presume some of you will not like what I say, for it is on the subject of putting arsenic in the teeth. Now, it is not a good thing to do this. If you put arsenic in the root of an inferior bicuspid or molar, you run a great risk. If you place it in the bicuspids, that is pretty bad, the first molar is worse, and the second one still worse; and when you get to the third molar, you are doing a dangerous thing. It produces irritation all along the side of the face and neck, establishing a soreness there for two or three years. Those are the facts. This specimen which I have here is a nice one, and I do not want any one to try to pull it apart; but I should be glad to have you see it. It shows the injurious effects of arsenic placed *in the teeth*, and I want to ask you, one and all, to stop using arsenic. You cannot mix it up in any way in the world but what it is arsenic, and the cloven foot is in it.

DR. D. D. SMITH, of Philadelphia: Mr. President, and Gentlemen of the Association, I purposely present myself this morning at the opening of this meeting that by holding up some "side lights" the paper which we are to consider may receive fair treatment and be discussed without prejudice. It seemed to me last evening that there was a disposition on the part of some participating in the discussion to misunderstand the intent of the paper. The first speaker, the gen-

tleman from New Orleans, placed emphasis on the "kind intentions of our Heavenly Father," asserting that if it was the design of nature that conditions should arise rendering the pulp of little or no value, then nature would have made provision for taking up or destroying the pulp. Just here let me state the intention of the paper under discussion is that a better understanding may be had, not of the destruction, but of the preservation of the pulp, that it may be accredited its full measure of importance in the tooth which it protects. Who would dare to assert that it was the intention of a kind Providence that we should see all about us men on crutches, or with empty sleeves, physical deformities of every kind? But *we do see them*, and we see that a kind Providence has left to the human race the solving of the problem of how best this condition of things may be met, just as he has left to us to investigate and solve, for the good of our fellows, the problem of how best to meet the disordered conditions of the human teeth. It is for us to ascertain the meaning of phenomena as presented to our observation, even though it be opposed to our present ideas. The dental pulp of a mature human tooth is not, possibly, the holy thing that past teaching has led us to believe. It is the teaching of the paper before us that whenever the pulp stands in the way of the greater usefulness of a tooth, as it sometimes does, we may approach it even to the laying on of violent hands for its destruction. There is not a syllable in the paper advocating or suggesting a condition calling for the general or wholesale destruction of pulps. The thought is rather that we are not to regard the pulp, especially in middle and later life, as a thing so sacred that we dare not approach into its domain. The teachings of the past and present make no discrimination as to the value of the dental pulp at different periods of life. The paper taught that in young life the pulp is of paramount importance, but after the tooth had, through the agency of the pulp, attained the maximum of consolidation, it could then be dispensed with without special injury, and sometimes indeed with positive benefit. One object of the paper was to draw attention prominently to that fact, and to correct, in so far as they are wrong, present impressions and teachings in regard to it. *There is a period of life when it is a holy thing*,—a time when it is in, as it were, the holy of holies. It is then the protector and builder of the tooth, and no effort should be considered too great to protect and keep it in full activity. There comes a time later in life when we may enter the domain of the pulp with perfect assurance, a time when it may stand

in the way of relief and service to the patient. *Then* it is ours to destroy it.

In reply to Dr. McKellops, I esteem the matter of effort at education among the masses of such importance that I hope the subject will be discussed by the Association, and that some practical and useful methods may be suggested which will eventuate in benefit to the vast army of youthful sufferers.

The impression seemed to be given us yesterday that the clinics of the dental colleges and the infirmaries ought to be suppressed, instead of bettering and widening their work. Why, gentlemen, the dental colleges do not begin to touch the suffering that is endured by the people of the land to-day. However many there may be of them, however many dental students there may be, they do not relieve a tithe of the dental troubles of the young people of the present. My good friend, Professor Truman, who I believe always antagonizes anything which I say, in public or in private, attempted to turn the teachings of the paper into a channel entirely foreign to its plain meaning, and then with great emphasis asserted, "I do not believe it." Did that declaration change the *facts* that are there set forth? I was deeply interested in the substantiation of every enunciation of the paper on the subject of consolidation or rebuilding of tooth-structure as given by Dr. Black, one to whom we all listen with the profoundest respect. I shall never forget an article which I read from him twenty years ago, perhaps, in one of our dental journals. It has been of such value to me that I venture to repeat the substance of it here for the benefit of some of the younger members of the Association. "Why is it that on some occasions your gold foil will not cohere; it balls up and you cannot make it work satisfactorily, while in making another filling with foil from the same book it is cohesive and its working satisfactory? The conditions are apparently the same, but the working qualities of the gold and results are quite different. If you look to your annealing lamp, possibly you will find the burnt end of a match lying on the wick, phosphorizing the flame just enough to destroy the nice working properties of the gold, and this is the whole secret perhaps of vexation and imperfection for possibly a whole day." I do not know that I ever light my spirit lamp without having regard to this valuable enunciation of Dr. Black. I need not eulogize this man, whom the whole dental profession regards as its most reliable scientific investigator.

Nothing in this whole discussion has so pleased me as his remarks

upon this paper. Possibly to some his talk seemed in opposition to the teachings of the paper, while in reality it was in confirmation of every proposition respecting the law of tooth-consolidation.

He stated most distinctly that, in accordance with his investigations, the consolidation of the tooth, to which we attach so much importance, begins in early life; that it continues on up to the period of about fifteen years, when it is less marked, to a little later period, say twenty years; when the change for the better seems to be more marked, and later on, passing from middle life to old age, there seemed to be little or no change. And that is in perfect accord with the law of pulp-action set forth in the paper. He said that this increase of density is hardly perceptible; but that *there is a change.* And thus it is. There is a change—call it consolidation, recalcification, rebuilding, or what you will—there is a change in the living tooth *for the better.* But destroy the pulp at six or eight or ten years of age, and there can be no change in that tooth for the better; all vital action for strengthening or preserving it is at an end. Keep the pulp in good condition to middle life, and you will foster conditions to enable the tooth to become practically decay-resisting. The vital forces within the tooth, fighting against the external destroying agents, will conquer by building into it materials which are decay-resisting; and these observations of the paper have met perfect confirmation in the experiments of Dr. Black up to the period of old age. The paper was entitled "The Office and Eccentricities of the Dental Pulp," and speaks of the breaking down of tooth-tissue in old age, not as a universal, unvarying action of the pulp, but rather as one of its eccentricities. Dr. Black claims, as I understand it, a reinforcement of vital activity and greater consolidation in the tooth in old age,—a condition found in no other organ or tissues of the body; so that we must conclude there is a misunderstanding between us in the use of terms; and if we could come together and perfectly understand each other, the seeming antagonism at this point would doubtless disappear. That there are instances in which there is softening of dentine and enamel in old age through retrograde action of the pulp I think some of the gentlemen here to-day will substantiate.

There is a change in the tooth-structure in old age, and no man who has had experience will dare to say that these teeth do not become more susceptible to decay, and fillings which have preserved the teeth for years begin to drop out. The teeth become softened not only around cavity-margins, but throughout the entire crown.

I claim this phenomenon to be due to the retrograde action of the pulp. If there is a deposition of material, as has been suggested, increasing the density of the dentine, we may conceive it to be an operation of nature analogous to what is taking place in other parts of the osseous system,—a deposition of material, but of a character to weaken rather than to make better.

DR. ABBOTT: I should like to say just a word in reference to this matter. From the reading of the gentleman's paper last evening and the remarks of the gentleman following it, one would judge that they held opposite views upon this question. The paper stated most emphatically, as the gentleman has stated this morning, that a change takes place in the teeth in old age,—a change which would apparently indicate decalcifying of the dentine to a certain extent.

This is undoubtedly true; but I have never attributed it to the action of the pulp. I believe the pulp does keep on with its work of depositing lime-salts so long as it is alive; that the tooth normally becomes more solid, and eventually even the pulp-chamber itself becomes obliterated. I never yet have seen a case of the softening or decalcifying of the dentine except where the necks of the teeth and quite a portion of the roots have been exposed. This decalcification may be attributed to the fact that under these conditions there is an acid present that slowly dissolves the lime-salts of the tooth, which, by the combined action of fluids, lips, and tongue are removed. I have never studied this subject sufficiently to determine it positively; but I am sure that the action of the pulp is going on in living teeth constantly, carrying to them, not taking away, lime-salts.

The question of pyorrhea is presented in the paper. "Why is it," it was asked, "that teeth which do not decay, as a rule seem to be more subject to this disease and this deposit than those which are cared for, those which are filled and attended to?" I have always attributed that to the fact that those persons whose teeth decay constantly, visit a conscientious dentist frequently. They have their teeth not only filled, but any deposits of tartar removed. The consequence is that there is very little opportunity for a sufficient deposit to produce pyorrhea. On the other hand, persons whose teeth do not decay, seldom if ever visit a dental surgeon. The consequence is, the conditions that produce pyorrhea are encouraged, until eventually it is so far advanced that the loss of the teeth is the only remedy that will afford relief.

As regards the second paper that was read last evening, I wish to say just a word in reference to the materials recommended for capping pulps of teeth. Mind you, I am always and unconditionally in favor of saving the pulps of teeth alive. I look upon it as not much less than a crime to destroy the pulp in a tooth. What we want to get at is the material for capping that will generally save them. It was recommended in this paper, as I understand it, that gold be used for this purpose by placing a thin plate of it over the pulp and burnishing it into the bottom of the cavity. What is the result? You know very well that if any space is left between the exposed point of a pulp and the material you place over it, it will invariably fill with serum. Even if escharotics are applied to the point of the pulp, still there will be an exudation into the opening. One cannot by any possible means place gold or any other plate of metal so perfectly upon the exposed pulp as to prevent this.

DR. PATTERSON: Are you referring to my paper?

DR. ABBOTT: Yes.

DR. PATTERSON: I did not advocate any such practice. I was speaking of deep-seated cavities, not exposures or very near exposures. I did not refer to that at all, but did refer to deep-seated cavities.

DR. ABBOTT: I misunderstood it, then; but the point is a good one, and I wish here to emphasize it. Now, a material, in order to be used successfully for the capping of pulps of teeth, must have several qualities. In the first place, it must not expand nor contract; it must fit perfectly, and irritate the pulp as little as possible. These qualities must be present in every case, or we shall be sure to fail.

Another point in the treatment of exposed pulps of teeth that every one should be most careful about is that they should never be punctured by the point of the instrument. If they are, they will almost surely die. The material known as gutta-percha was recommended by some one for this purpose. This fails in most cases, in consequence of its property of expansion under moisture The moisture from the exposed pulp is sufficient to produce expansion of it; sufficient to cause it to press more or less upon this organ, which sooner or later will become inflamed and die in consequence.

DR. SHIELDS: From Dr. Smith's reply this morning, I took it for granted that he was under the impression that the discussion was closed. There is a very important point in the paper which has not been reached. It is "that if a pulp is saved for a number of years,

that cavity can then be filled with gold, and owing to the condition of the pulp and the change of the dentine, you will find around the margins of that cavity a blackness." That blackness, gentlemen, most positively, in my estimation, is caused by defective workmanship, and the dentine has nothing in the world to do with it. If I misunderstood the doctor, I should be glad to hear from him; but the compatibility and incompatibility of gold are subjects really that should not be entered into, because gold is one of the most compatible substances with tooth-structure known to the science of dentistry, and if gold is properly introduced into a cavity, you will never have a black rim around your filling.

DR. RHEIN: The point in Dr. Smith's paper where he refers to the condition and care of children's teeth is one to which we ought to give more than passing attention. If there is any body of dentists in this country who owe some duty to the public at large (in their official capacity), it certainly must be this Association, and this point in the paper has struck a responsive chord within me. I believe it ought to be a part of our duty to endeavor to do something in the way of improving the teeth of future generations in this country. I refer to the question of the cleanliness of the teeth of children before they are admitted to the daily sessions of the public schools. If as a national organization we would send some communication to the various boards of school commissioners throughout this country, informing them of the value of an examination of children's teeth before entering upon their daily studies, one of the greatest strides toward improving the future condition of the teeth of the people of this country would be achieved. No greater benefit could be derived from the discussion of this paper than if a resolution to that effect should now be spread upon our minutes. It is well known to all of us that a great deal of stress is placed in the public schools upon the general condition of the cleanliness of the scholars when they make their daily appearance. Among the best of our public schools the children are not admitted to the daily sessions with dirty hands or dirty faces. They are sent home in order to have their hands and faces properly washed before they are admitted to the session. How well we know how much greater stress should be placed upon the cleanliness of those children's mouths. It is to be hoped that this duty which we owe to the commonwealth will not be overlooked by this body before we adjourn.

Now, with reference to the condition of pulps, a word may not be

amiss. I agree heartily with Dr. Smith and every other gentleman in regard to the advantages derived from the preservation of the pulps of teeth before they have reached the age of maturity, before the tooth-structure has been properly consolidated. The distinction which the author of the paper has made this morning, that the class of cases to which he had reference were not normal physiological conditions, but conditions that were pathological, should prevent comparison of treatment of such cases with that given to an average case. In all these cases, as a rule, there is some nutritional disturbance. Professor Black referred to this point in his discussion last night. In abnormal cases there is excessive irritation or a lack of the proper protoplasm reaching that portion of the system, which is a basis of all these abnormalities. Now the question arises whether it is advisable to allow a tooth to go on with a condition of abnormality about the pulp, or whether it is better to remove such a pulp, and the weight of all the experience which I have had on this subject is in the direction of the immediate removal of any pulp just as soon as any abnormal condition presents itself. Many of the gentlemen to whom I have listened on various occasions, and who have spoken about the preserving of a pulp to the very last limit at all hazards, forget and possibly are not aware of some of these cases finding themselves in the offices of other men, with an abscess or other conditions of a more serious nature, due to the fact that they have endeavored to save an organ whose usefulness has departed.

There is one other point in the paper to which valid exception should be taken, and that is the remarks of the author on the condition of pyorrhea alveolaris. He has failed to state in his very admirable paper the fact that he does not differentiate between or indicate what form of pyorrhea he is referring to. There have been under observation a very limited class of pyorrhea cases which have their origin in pulp-disturbance and make themselves known around the apex of the root, but such cases are not common. They do not begin to constitute more than an infinitesimal portion of the large group of pyorrhea cases that present themselves; furthermore, I must take issue directly with the statement in this paper that pyorrhea does not present itself in youth. In a paper on infantile scurvy presented before the First District Society by Dr. Kirk, and published in one of the numbers of this year's *Cosmos*, he distinctly calls attention to infantile pyorrhea, and at that time I referred to a similar case that reached my hands. This patient had been referred to me by Dr.

a conclusion in a scientific manner. About the margins of fillings in the mouth of a gentleman about fifty-five or sixty years of age, I found the condition mentioned by Dr. Smith. I was curious to know whether or not some constitutional change was not responsible for this unusual condition. I removed a portion of the decay, and sent it over to the pathological laboratory for examination. The report from the examination was that the bacteria of tuberculosis were present in large numbers, something I was not looking for at all. There were no external appearances, so far as casual observation was concerned, that indicated this; but I did think there might be some constitutional disturbance of the character of diabetes or Bright's disease that had caused a change in the condition of the oral cavity which favored the action of destructive agents on the teeth.

We shall have to change our views about what causes decay of the teeth if it is demonstrated that the pulp at any time during its life becomes an organ of disintegration. I think we have an abundance of proof that this organ is constantly carrying nutrient material into the tooth and consolidating it, but no proof as yet that its function can so radically change as to become destructive of tooth-tissue.

Now, just a word in regard to a point in Dr. Patterson's paper. I think the statement was that non-cohesive foil or soft foil could not be made cohesive. If I understood it, the idea was that the mass could not be welded together, and because of this fact the soft gold became a better non-conductor of thermal changes. While he was reading that, just one instance came to my mind. I do not know just how long ago it was, but it was not many years ago, that Dr. Gardiner, of Chicago, whom you all know, had occasion to give attention to a tooth filled by Dr. Allport some thirty-five years or more before. It was necessary to remove this filling, and Dr. Gardiner, out of curiosity, and knowing that Dr. Allport always kept a careful record of his operations, desired to know what kind of gold was used. Taking the filling to Dr. Allport, upon looking at the register he reported that it was filled with soft foil. Then the plug was passed through a roll and flattened out into a sheet. If there had been no welding of the leaves of this foil, certainly that could not have been done.

DR. D. D. SMITH, of Philadelphia: It was my intention, when on the floor before, to indicate what seems to me to be the most important points opened for discussion by this paper. One point has since been touched upon by Dr. Abbott; that is, devitalization at different

periods of life. It should be made clear whether there is any distinction to be drawn between one period of life and another. Dr. Abbott would claim that there is no difference; but it seems to me, after an extended practice, that there is a very great difference.

Then as to pulp-capping. At what period of life and in what teeth shall we attempt the capping of pulps? Shall we direct our efforts to save the pulp in a tooth at middle life as we ought to do in a young unconsolidated tooth? The inference to be drawn from the paper is that after consolidation has taken place, if there is exposure of the pulp from decay, or if from any cause the pulp assumes a pathological state, it can be destroyed without abridging the usefulness or risking the preservation of the tooth; and that it is better to destroy it than it is to attempt capping.

Another point which has never been at all considered in our dental literature, and which has not been alluded to in this discussion, is the class of teeth and character of exposure in which the capping of pulps should be attempted. From the teachings and discussions upon this point it is to be inferred that it is just as easy, just as desirable, and just as obligatory to cap an exposed pulp in a wisdom-tooth from a cavity on its distal face, or that of a second upper or lower molar, with a similar cavity extending away down on the root, or to cap a pulp from the cavity of decay in a lateral incisor or a bicuspid, as it is to perform this operation on a lower molar with the exposure from the crown or from the mesial face. Now we all know that there is a wide difference in these operations, and that the distinctions ought to be carefully made. Who would attempt to cap the pulp of a lower wisdom-tooth exposed from the distal face? The man who does it takes risks on the life of the patient that I would not dare to take. Who would attempt the capping of a pulp in a lateral incisor or in bicuspids where the cavity is shallow and circumscribed, —classes of teeth in which pulps die on the slightest provocation? In bicuspids or laterals, approaching maturity, in cases of pulp-exposure it is far better to destroy at once than to attempt to prolong a feeble, flickering life which is sure soon to succumb to the irritation of exposure and the manipulations attending the most careful process of capping.

There was one other point suggested by the paper that I would gladly have heard discussed at this meeting, and that is, the prognosis of a set of teeth subjected to natural and healthful mastication *versus* heredity. The paper plainly opens this subject for considera-

tion with the intimation that the proper exercise of the true function of the teeth is a more potent factor in good tooth-formation than any condition of inheritance. But I will not trespass on your time.

DR. PATTERSON: I should like to take up a little time of the Association, but I will not, because my paper ran into the realm of pathology, and that I do not want to take up now. But in reference to that part in regard to non-cohesive gold there has only been one remark made that I shall refer to, and that is the remark of Dr. Hunt. Dead-soft, non-cohesive foil is not amenable to any welding process. The foil that the doctor refers to and calls soft foil, is soft cohesive foil, which is totally different, and when put through the mill it will cohere. Dead-soft, non-cohesive foil is not amenable to welding, whether put through the mill or under the hammer. The distinction with some speakers is not very clear as to what non-cohesive gold is. The surface is such that as it comes from the manufacturers, there can be no welding or cohesion.

DR. RHEIN: I rise to a question of privilege. Before we leave the subject I should like to offer to the Association a resolution covering the point relative to the care of children's teeth referred to in Dr. Smith's paper. I should like to present it to the Association now because it is the proper time. The resolution is as follows:

Resolved, That a committee of three be appointed whose duty it shall be to draw up a suitable circular letter, embracing the recommendations concerning the supervision of the cleanliness of teeth of school children as advised in Dr. Smith's paper. They shall cause this to be sent to the various Boards of Education throughout the United States, and to the dental journals and press generally.

Resolved, That said committee be reimbursed from the treasury of the Association for expenses they may incur.

DR. JACK: That appears as miscellaneous business, and the discussion of it will interfere with the progress of Section III.

The VICE-PRESIDENT: The resolution has not been seconded. I will now call upon Dr. Bryan, of Switzerland, who has a few matters to present.

DR. BRYAN: I have been informed by the Chairman of the Executive Committee that you have done me the high honor of electing me an honorary member of your Association. I am not aware of any great thing that I have done for dental science, and asked the gentleman what was the reason for placing me on this honorary list in such an Association as the American Dental Association. He informs me that

he is aware of various things that I have done in Europe for American dentistry. I hope that I may be worthy of the honor ; and if not, my future life and efforts in dental science will be to earn that honor.

I wish to call your attention to a few little instruments that I have brought with me. In foreign lands we do not get a chance to get at your great manufacturers with these things and have them placed on the market, while other things are placed before the profession in a commercial way. I propose to present to you a few of the little things that have been invented by me and have accumulated around my office.

The Sponge-holder with Mirror to moisten the corundum or any other grinding-wheel protects, at the same time, the tongue and lips. It catches the gold that falls when polishing, and keeps the corundum cold, sharp, and clean. S. S. White moistening pads, or any other moisture-holder, can be used with it. Clippings of sponges are preferable, as they do not catch in the grinding-wheels. Sponges or pads should be kept ready moist, in a dish of water, and after use should be preserved in a dish to burn and recover the gold scraps. After grinding down and burnishing the filling, dip the wet sponge or pad into the polishing powder desired, and convey it to the filling and buff or wood wheel or point to be used.

Mirror with Shell-shaped Rim.—This is very useful when filling the upper teeth, as it conveys the filling-material to the cavity and catches all the fragments which may drop during the operation ; it throws light upon the tooth, and reflects the operation and cavity at the same time. Moreover, it is useful in catching chips and old fillings, or any other small object removed from the teeth or cavities. It can also be employed, with advantage when excavating or treating, or when using the engine, by those who work by reflection in a mirror. By means of the mirror, gold crowns and matrices can be easily carried in and placed on the right spot and held while adjusting.

I thought I had presented this mirror with rim to the American Dental Society of Europe on a previous occasion (in Paris in 1889), but Dr. Sachs has published cuts of this same mirror recently in a German dental journal, and assures me that he never saw mine. I have bills from makers and letters which show that I made and used it and gave it to friends of mine at least six years ago. It does not matter, however, who invented it. It is a useful instrument, and especially with the mat golds, new and old, saves much waste of valuable filling-materials.

The Cervical Tooth-clamp is very easy to hold, as the fingers and thumb get a good grip of the roughened handle or ends. By pressing the back, the clamp can be made to slide up or down so as to fasten it at the back. The front bow (arc) having been cut, it can be bent in all directions, so that it can be fitted to the most irregular cavity. The clamp can be made of steel; the edges will then be sharp and can be well fastened on. When the clamp is fastened to the tooth, the screw can be fitted on by its rough edges, so that the clamp is made fast in the desired position. This clamp will fit on the wisdom-teeth (third molars) as well as the incisors, and I have been able to fasten it to every tooth I have tried.

The Dentist's Ledger (*Journal*).—As the preface points out how the ledger should be used, it need only be added that when there are no blank pages for all the members of one family, such must be added. Even when the page is full, new ones may still be pasted in. If it be assumed that a patient, even for a few years, will not require a whole page, one-third of a page may be allotted to him, and two more patients with like prospects added on the page in order to fill it. After a few years it will be found necessary to have the ledger rebound, and then you add new pages (from three to five hundred), and when necessary, to family pages, to which the same number is allotted as before, but in the newly added part you continue the numbering in regular order.

I have had such a ledger in use for the last thirteen years, in which over thirteen hundred patients' names are entered, and my own notes and drawings are appended.

I have had my ledger rebound three times in twelve years, and each time have added fresh leaves, and rearranged them so as to bring all members of families together, keeping all in one book.

SECTION III.—Continued.

The New Mat Gold.

PAPER BY LYMAN C. BRYAN, HONORARY MEMBER.

THE dream of the dentist since the discovery of the cohesive properties of gold foil has been to find a cohesive gold preparation which would be sufficiently plastic to be used as the cements and amalgams of the day are used. It is useless to review the numberless attempts which have been made to reach this desirable end. Men have given years of their lives in experiments to prepare a plastic gold.

Societies have offered rewards for, and men have seen fortunes in, this universally sought after glittering ideal. The alchemist of old who sought to *make* gold of other substances has been outstripped by the modern chemist in his efforts to produce a plastic gold. Foils have been prepared in ethereal pellets and cylinders, always approaching the end desired, but the ideal has always been beyond their reach. Within the last few years a limited circle of dentists in Switzerland have passed the word that Dr. de Trey had solved the riddle, and was in possession of the secret of preparing an ideal plastic gold.

The rumor has spread that the doctor has made clinics at the dental societies in various parts of Switzerland, and within the last few months the gold has actually been placed on the market. And now, with this gold in the hands of the profession generally, there has arisen quite a furore, and little else is talked about when dentist meets dentist than the wonderful qualities of the new mat gold. Our Swiss friends are quite enthusiastic about it. Whether it is one of those passing whims which ruffle the surface of the usually placid lake of dental life, or whether it is a regular "trade wind" that has come to stay, remains to be seen.

I fancy there is much of the same style of excitement about it as

there was about the Herbst method, and that the results will be about the same. Every one ran wild over the rotation method; men practiced it a week and came out in papers describing the wonderful results; but like any other fall style it was replaced in the spring with another. A few capable men continue to practice the rotation method with good results still, and will continue to do so in a conservative way, while the rank and file of the profession have dropped it after a few failures, and are loud in their condemnation of it. Implantation ran a similar race; men like Cunningham reported one hundred per cent. of successes, and statistics of good results were built into huge pyramids before the giant-cells got in their work. Now, every dentist who had one hundred per cent. of successes has a choice collection of bicuspids and other natural tooth-crowns from which the roots have melted away before the inexorable laws of nature.

Still, the implantation craze will have taught us much that is new in that line, and will have established new laws for our future guidance, and added new facts to the science of dentistry by which we can as a profession profit.

If, in time, Solila gold does not satisfy our wants and prove the ideal gold which many disinterested people of to-day think, it will certainly indicate the road to other pilgrims seeking the ideal, for it is a step in the right direction.

As so much was being said in praise of the Solila gold, I went to Dr. de Trey despite certain personal differences, and asked him for some information about the gold. I was unable to learn anything about the preparation of the gold, and the facts elicited from him are appended in the form of an interview.

The doctor filled some teeth out of the mouth in a remarkably short space of time, and the manipulation was such that I had my doubts about the adaptation and general cohesion of the mass of gold condensed by hand pressure and very slight malleting, building up a contour filling with no undercuts or retaining points in certainly one-fourth the time usually employed in such cases by the usual methods.

I not only had the curiosity to have the filling removed and rolled out, but I wanted to *see* it done, and was taken into the laboratory, where the filling was rolled out into a beautiful yellow soft ribbon of about No. 250, without a defect as far as I could see.

Dr. Gysi, of Zurich, was requested to make some trials and examinations with the microscope, but as yet he has only been able to

examine the results of pressing in a large block of the gold with a flat hand-plugger near the size of the cavity. He found that certain depressions cut with a wheel-bur and flat-bottomed, were perfectly filled without the use of pluggers to condense directly *in* the depression.

Dr. Jenkins reports much pleasure in its use for the short time it has been on the market for the body of large fillings, but says he prefers to finish the filling with a gold which does not require so much time to finish it down, owing to its extreme hardness even after hand-pressure condensation.

This extreme hardness of the surface is in one way an advantage, and again a disadvantage, until one becomes used to it and learns not to build up more than is actually required. Carborundum points will reduce it quickly, however. A twenty-year-old large molar crown-filling which Dr. de Trey showed me had a perfect finish and good margins, and was said to have been made (gold packed) in ten minutes.

After a month's use of this gold I made a clinic before the Basel Odontological Society, filling a superior first bicuspid distal and crown contour in nine minutes, and I think it was well condensed.

This gold should not be malleted like other gold, as the first stroke condenses the point under the packer, and a second blow will cause pain and be of no advantage.

Dr. Patterson reports very great facility in rapid filling, little loss of gold, and superiority to the other crystal and mat golds in the market, but like myself can only judge of it superficially after a month's use, and one can only judge of results after years.

The manipulation is so entirely different from that of other golds, especially the foil preparations of ribbons and cylinders, that considerable experience will be required before the best results will be attained by any operator not familiar with the present mat and crystal golds on the market.

Such is the importance of this matter of improvement in our gold that I have entered at some length on the consideration of the subject in endeavoring to handle it in an impartial way, and call the attention of the profession to a material which, after a very limited trial, has in my hands shown evidence of great superiority over similar preparations and *all* preparations of gold with which I am familiar.

For the last month I have filled only with this gold, and all cavities,—more especially as a test of its general adaptability,—and I am generally pleased with the results.

A Statement of Facts relating to Mat Sponge Crystal Gold, called "Solila." By Dr. E. DE TREY.

After twenty years of research in gold crystals, I have at last discovered this quality of mat gold which I have the pleasure of presenting to the profession. In my researches my object was to do away with the difficulties presented by gold filling by means of the different kinds of gold till now in use. *It was necessary to discover a gold just as easy to handle as amalgam. I may to-day assert that this object has been attained.* I can say more: the Solila gold is more malleable, easier to work, and adheres more perfectly to the walls of cavities than amalgam.

I have filled with my gold at different times, and during fairly long periods, for the space of twenty years. I have used nothing but this during the last three years, but not being conveniently installed in order to manufacture it, my health was often seriously injured by deleterious vapors, and I abandoned the pursuit for a time to return to it once more, each time more convinced of its great superiority.

My gold was not at first in a condition to be presented to the profession, as it could not stand transportation and had a very imperfect form. I have been able, through a lengthy experience, to judge of the value of this gold, and, notwithstanding its faulty condition, it is with this gold that I have made the best fillings during my practice. I have been in a position to study these fillings, and have ascertained that after several years they preserved excellent surfaces, the edges were intact and had suffered no discoloration.

It is owing to its *pureness* and to the *fineness of its structure* that its adhesive and malleable qualities are developed in their highest degree, allowing of its being impressed into the crevices of cavities invisible to the naked eye. It is adhesive without heating, and may, therefore, be used soft to fill the bottom and walls of delicate teeth; yet, when only slightly heated, it is easier to handle (work). It is easily combined with tin foil, and united to this metal forms a very dense mass, which is antiseptic and non-conductive, rendering good service in covering sensitive *dentine*. The difficulty of rendering these two metals adhesive does not exist any more. This gold adheres by pressure to all the higher metals from which the oxid has been removed mechanically; thus it may render good service in prosthetic works, such as *bridge-work*, *repairs*, *the setting of teeth*, doing away with all shrinkage of plates through soldering. The thoroughly dense surfaces of this gold are even harder than those of heavy gold, Nos. 120 and 240, *wherefore care should be taken not to use too much*, because it takes time to cut with "burs" or corundums. It can be folded nearly as easily as gold foil, without fracture (breaking) or loss of metal.

In order to make the work easier for inexperienced hands, one can, after heating, make it into pellets, like amalgam, between one's clean and dry fingers. Operators who have naturally moist hands should take it between two napkins, or by means of a piece of very fine skin not producing mechanical impurity. A special quality of gold without woof is made for this purpose. *The condensation of Solila is so quickly* accomplished that the operator

cannot understand it at first, and may thus lose precious time by overfilling the cavity, which happened to me at first. However, one should not sin in the opposite direction: I would advise beginners to try a few experiments *outside of the mouth* on extracted teeth, set in a plaster block varnished, or in lead, so as to get an insight into the condensation and the heating of this gold. I did this myself constantly, and thus got to know thoroughly the peculiarities of my gold. The expense of these experiments will soon be made up for by the ability and sureness in working acquired.

On being heated, it is exceedingly sensitive, and dentists will find it to their advantage to seek the point where it is most malleable. Solila gold changes color when heated, assuming a deeper or lighter shade according to its being subjected to more or less heat, the various shades corresponding to various degrees of malleability. *It should never go beyond the temperature of dark red.* It can be heated over a good spirit lamp, the flame of which is very transparent and the wick of which does not char, or else with a "Bunsen" gas burner; but the *too intimate contact with the flame may melt its fine crystals*, which, in their agglomeration, form quantities of small brilliant granulated particles which harden it.

Heating on a mica leaf reddened, made red-hot beforehand on the flame to free it from its impurities, is *the best method of all*, and I recommend it to operators who wish to do neat work; but it requires a fairly powerful lamp. It is preferable also that the gold should be heated *on both sides.*

It cannot be too strongly urged that this gold should *be kept well closed when not used*, as ought to be done with all kinds of gold. When a sunbeam crosses the surgery, one can see how many impurities are flying about. These particles of dust settling on the gold, are burned in the heating process and form a smoke which soils the crystals, thus preventing the perfect contact which is necessary to their proper adhesion. It is to this want of care that I attribute the greater part of the difficulties gold filling presents. How many operators are there who can say they are careful of their gold?

Instruments and Working.

In the principal depots are to be found a list of eighteen instruments manufactured *exclusively for "Solila,"* and which are absolutely indispensable in its use. It is useless to employ other hand packers, as they pierce and tear the gold, and condense it very badly. I made and tried over two hundred instruments before adopting this set, which will be made still more complete.

These are the principles on which they are constructed:

Reduce the condensing point as much as possible, so that pressure may have greater power of action, *always maintaining around this point rounded condensing surfaces, without permitting a break of continuity at any point, to be utilized by rolling the point of the instrument on the layer of gold to be condensed.* The radius of the circle that the curve of the condensing surface would form is thus always perpendicular to the condensed surface.

Rolling the point of the hand packer on the gold has the advantage of not obliging the operator to lift it as often as with smaller old-fashioned hand packers. A motion from right to left and from left to right given to the

handle of the instrument produces the rolling, and acts in the same way as a flatting cylinder on the layer of dull gold, laying it and spreading it like a paste against the surrounding walls, forming a condensed surface which is very uniform right up to the end of the operation. With former hand packers, uneven surfaces are formed, ladder fashion, badly condensed, and rendered too ragged by their clumsy dents and angular edges.

The advantages of these new hand packers may thus be enumerated:

I. *A more rapid execution in the work*, on account of the point being larger as compared to the size of the cavity, *so that it condenses a larger surface without being raised.* II. In laying and spreading the gold the point of the instrument frees itself from the layer of dull gold, while with old hand packers the latter is folded back on account of the pressure around the point, which tears the gold when being raised. III. *These instruments do not produce any fracture of the enamel*, because having rounded surfaces they slide on the friable edges.

This form of instrument can very well be used without serrations, and that is how I prefer them for my own use; but this kind of work requires a certain practice, and I have found it advantageous to have them made with *serrations* in order to avoid accidents by inexperienced dentists.

I will demonstrate this system with polished points at future congresses. If, therefore, at first the serrations of my new packers are too sharp, it is easy to blunt them at the sides by means of a soft stone (Scotch stone, *e. g.*); that will render easier the withdrawing of the instrument. *It is important to keep the points clean by washing them from time to time with alcohol.*

I particularly advise for "Solila," working *by hand pressure*, for those dentists who possess sufficient strength. It is this sort of work that many old and eminent practitioners revert to as being *less painful and more harmless to the patient*, and because it yields indisputably more lasting results. At first, hand work is harder for the operator than mallet work, but in a short time the muscles of the arm are hardened thereby, and it gets less fatiguing every day. One takes to it, and from a hygienic point of view it is a strengthening exercise for the body. "Solila" is also easily worked by automatic mallets, such as "Snow & Lewis" or "Abbott's." They are the only ones, besides hand mallets, which are suitable to my gold, wherefore I have, to begin with, made six points, which are to be found also in the depots, for ordinary cases. The hand mallet is superior to all others, especially in the use of polished points. As "Solila" *condenses very quickly*, it will be well if the operator *regulates the stroke* by *softening it*, otherwise the patient would have difficulty in bearing the operation to the end.

Beginners are requested to read attentively the prospectus inclosed in the boxes; it shows how to begin the gold filling, which it would be useless to refer to here. In order to seize hold of the gold, specially flexible larger pincers are necessary; they are also to be had at the depots, and the scissors must be sharpened to a narrow edge so that the basil be very narrow, or they would condense and harden the gold, thus making it difficult to work; this latter detail is of the utmost importance. Special scissors are also to be found at the depots.

BÂLE, June, 1895.

SECTION III.—Continued.

Scientific Filling of Difficult Roots.

PAPER BY NELSON T. SHIELDS, OF THE SECTION.

ALL operative dentistry is minor surgery, and surgery is the mathematics of medicine. .All dental operations are the embodiment of mechanism of the highest order. Whenever we have to substitute any portion of our anatomy, we at once undertake a most difficult task. We are fearfully and wonderfully made, and in no other department of medicine is this more fully realized than in that which pertains to dental surgery.

The dental pulp sends its fibrils, microscopical in diameter,—about the one three-thousandth of an inch, varying in size according to the portion of the tooth,—throughout the entire tooth-structure. A perfect tooth is one which is thoroughly filled with nerves and blood-vessels. This tooth in time may become decayed ; and from the inability of the dental pulp to throw out odontoblasts sufficiently fast to protect itself by their calcification from the advances of the decay, it becomes exposed, and eventually dies.

We are now called upon to fill that tooth so as to make it perform its functions as perfectly as before. Our Lord made our teeth and their microscopical structure, and poor finite man can only fill this pulp-canal and the dentinal tubuli imperfectly. We must, however, come as near our Lord's perfection as possible. We must reach the apex of each canal, and we must not know the meaning of the word fail. All canals can be thoroughly cleansed, and not a particle of decomposition be allowed to remain, even at their very apices. Apply the rubber-dam, and always open into a canal with a bur, because thus you will not block the mouth of the canal with large pieces of tooth-structure. Always save all the tooth-structure possi-

ble, but never allow the saving of a piece of tooth-structure to prevent your entrance into a canal. Take it away, when necessary, without hesitation, and reach the apex of the canal. After opening into the mouth of the canal with a bur, use Donaldson's nerve-canal cleansers Nos. 4 and 5. With a small cleanser and a little perseverance I can readily reach the apex of a difficult canal. I then puncture a small piece of rubber-dam with the cleanser, and again reach the apex, and indicate, with the dam, the exact length of the tooth from apex to cutting or grinding surface. Moving this cleanser up and down, I enlarge and clean the canal, and treat it with non-coagulating disinfectants. I am then able to introduce a larger cleanser, after having a rubber-dam indicator placed according to the length marked by the original indicator. If this larger cleanser should carry up with it loose tooth-structure, and block the canal so that the indicator cannot go to the cutting or grinding surface, the obstruction can be easily removed by inserting the original cleanser, and turning it round a few times between thumb and forefinger.

I always make a plugger for each canal, using the Donaldson bristles for this purpose by nipping off the end, and, placing between thumb and forefinger, flatten the end on an oilstone. I make this plugger, according to the original indicator, reach the apex without going through. I then use soft gold foil No. 4, and if I am filling a small canal I frequently do not fold it at all. I cut it in very thin strips, and cut the strips into pieces one-third and one-fourth the size of a pinhead. The flattened end of the improvised plugger readily takes up a small piece of gold, and the small gold displaces the air in the canal on its advance to the apex; and the gold being a solid substance, it is readily shown by the indicator when it reaches the apex. As I continue with the gold, the indicator gradually comes farther and farther away from the tooth. After I have thus placed a few pieces of gold at the apex, I do not *think* I have the apex filled, but I *know* I have it filled. In surgery we do not guess at things; but we coolly calculate them, and know that they are correct. The apex being filled with gold, I would advise using the material you can best manipulate for filling the canal. This done, we have the root thoroughly filled, and with proper disinfectants the canaliculi disinfected, and necessarily the root is in the best possible condition; and when I say the "best possible condition," I mean that it is better than any other material at the apex, according to the highest standard of scientific dental surgery.

SECTION III.—Continued.

The Use of Compressed Air in Operative Dentistry.

PAPER BY S. FREEMAN, OF THE SECTION.

EVERY workman, in the exercise of his art, should be provided with proper implements. For the fabrication of complicated and curious pieces of mechanism the artisan requires a corresponding assortment of various tools and instruments. For giving proper effect to the fictions of drama, the actor should have at his disposal a well-furnished wardrobe, supplying the costumes best suited to the personages he is to represent. For the perfect delineation of the beauties of nature, the painter should have within reach of his pencil every variety and combination of hues and tints.

Now, the dentist, who is called upon to treat and relieve the pain of such delicate and sensitive structures as the teeth, which bear an intimate anatomical and physiological relation to some of the most important organs of the body, should naturally look forward to that which can assist him in the practice of his profession. It is therefore essential to his success that he be provided with all the necessary appliances which will aid him in his operations and mitigate the sufferings of his patients.

With this aim in view, no procedure appears to me to be more conducive to success than the application of compressed air, an agent which I employ extensively in operative dentistry; and it affords me great pleasure to call your attention to the divers instruments which are used, and the application of which I will explain and demonstrate in detail.

Permit me to explain the methods of producing compressed air and the manner of conducting the same to your operating chair. It is obtained by means of a suction pump which sucks in the air and forces it through a pipe to a reservoir, as it is necessary for our pur-

pose to have a continuous and considerable current. I would not advise the use of a hand pump or small cylinder, as in employing them you will find that both the air and the operator become quickly exhausted. I would therefore recommend that which is known as the champion beer pump or the compound pump of the same manufacture, for I find them both the simplest in construction as well as the most satisfactory air-compressors on the market to-day.

Before placing the pump in your office, ascertain how many pounds of water-pressure you have; if, as in my office, you have only twenty-five pounds, the champion pump will not furnish, contrary to the claim of the manufacturers, the same amount of air-pressure as water, as there is, as I have discovered, a loss of a few pounds; such being the case, the compound pump (although a few pounds of pressure are also lost) is preferable, as it is frequently necessary to have the air at a pressure of forty to fifty pounds to the square inch.

This pump is connected with the reservoir, which is a tank containing eighteen or more gallons of air tested to one hundred and fifty pounds' pressure to the square inch; from this runs a quarter of an inch block tin pipe with branches to my laboratory and operating room; to this pipe I have attached a regulator and a gauge, the regulator being nothing more than a screw valve: as you loosen the screw you close the valve, and *vice versa.*

From the regulator a pipe leads to the gauge, which indicates the number of pounds' pressure. I use the one hundred pound gauge, as it enables me to ascertain the maximum amount of pressure in my office. The pressure generated by the compound pump is sometimes so great that a lower gauge will not register it.

To the gauge is connected a distributing pipe with three small cocks to attach the rubber tubes and the cut-off. The tubes should be of heavy rubber, so as to withstand a high air-pressure. The cut-offs close automatically, and you may use the somewhat antiquated expression,—Touch the button and the air will do the rest.

Before proceeding to explain my other devices, permit me to call your attention to this pump, which I am enabled to present to you through the kindness of Mr. Noack, manager for H. D. Berner; he has sent this complete apparatus here, which permits me to demonstrate the action of compressed air, as I was requested to do by Dr. L. Jack, the Chairman of the Committee on Operative Dentistry.

These pumps are a part of one of the best hydraulic atomizing outfits that I am aware of. I use the word hydraulic to designate the

method in which the air is compressed, for you have single, double, and rotary hand pumps. When you are unable to procure water, the rotary pump attached to an electric motor is preferable.

In the practice of dentistry it is absolutely necessary to have the mouth in an aseptic condition; to produce this effect no doubt many of you use the hand atomizer, which by the continuous pressure of the bulb causes a slight cramp in the hand; with the compressed air apparatus we do away with this work, you have the tube steadied, and can thoroughly cleanse the mouth or any cavity. I derive excellent results from the following prescription:

℞—Borine, 1 part;
Pyrozone med. 3%, 2 parts;
Water, 1 part.

This makes an agreeable mouth-wash applied with a spray.

No doubt you have frequently met cases where you would prefer to place on the rubber-dam, but owing to the patient's inability to breathe through the nostrils you have been compelled to send your patient away or otherwise work at a great disadvantage. How often have you cast about for a remedy? It is a simple one. A two per cent. solution of cocain placed in an atomizer attached to your compressed air apparatus, which is gauged at ten to fifteen pounds' pressure, and the spray thrown into the nostrils, will invariably relieve that posterior nasal catarrh or reduce the swollen tissues of the nares to such an extent that you can proceed with your work in a few minutes without any inconvenience to your patient. In using the spray for this purpose have your patient sitting upright in the chair, the head inclined slightly forward. Insert the tube horizontally into the nares, and do not apply over ten to fifteen pounds of air-pressure, as otherwise you may set up an irritation of the middle ear.

In stomatitis of the various kinds, the spray employed with a high pressure produces excellent results.

In aphthous stomatitis, which usually requires about a week to ten days to heal, I have succeeded in obtaining a cure in two days.

Probably the citation of the following case will enable you to better understand the value of this agent:

Mr. H., age seventeen years, applied to me for treatment May 7, 1895, suffering from large grayish patches situated on the lower and upper lips. These patches were very painful; I applied the following prescription:

℞—Pyrozone med. 3%, ℥ iv;
Borine, ʒ ii.

with my atomizer under forty pounds' pressure. In about two minutes it produced bleeding of the sores, washing away the grayish patch, and you could see the ebullition of the pyrozone, leaving escharotic spots similar to those produced by the application of the caustic pyrozone. I gave the patient the mouth-wash recommended by Dr. Sudduth, of pyrozone and soda mint; the patient reported on the 9th day of May having no signs of the patches. This method of treatment was not painful, and proved very efficient, as I have used it in similar cases with uniformly good results.

A patient affected with mercurial stomatitis presented himself to me on June 5, 1895. I found the characteristic lesion of the edges of the gums, with considerable ptyalism, which excoriated the corners of the mouth, and was informed by the patient's physician that some time previous to the appearance of this disease the patient had been taking a sixteenth to an eighth of a grain of biniodid of mercury three times a day for three months, and during this medication he would discontinue the use of the drug as soon as the teeth were sore to the touch. He was having his teeth attended to by a fellow-practitioner, who, having learned his condition, upon the appearance of this lesion treated the parts locally with glycerol of tannin and iodin, using as a mouth-wash listerine. After treating the case for three weeks without success, he concluded that it was secondary syphilis, and sent him to his physician for treatment. The physician, recognizing the condition as a mercurial stomatitis, referred the patient to me.

I used the pyrozone med. three per cent. on the diseased parts with a spray gauged at thirty pounds' pressure, and gave him for a mouth-wash—

Pyrozone med. 3 per cent.,
Borine, equal parts.

When the patient applied to me, he could not eat his food without pain; the next day he reported, stating that it was the first time in some weeks that he enjoyed eating a meal. After three treatments with the pressure increased to fifty pounds, I found a decided improvement in the condition of the mouth.

The sloughing of the edges of the gum disappeared after the first treatment, and in four days the gums were in quite a healthy condition. At this time the patient was called away from the city, and I have since learned that the tissues are in a perfectly sound condition.

Before applying any medicines to the gums, it is always necessary

to have a dry surface, so that the medicament may be readily absorbed, and not distribute itself over the surface of the tissue. I found it somewhat difficult to obtain a dry condition of the gums in the posterior portion of the mouth before employing this apparatus. Now I find it a very simple matter. By drawing back the corners of the mouth with a napkin or piece of cottonoid, and throwing the compressed air directly to the spot, it only requires a few seconds to procure the desired condition of the mucosa, and upon applying your medicines you get immediate absorption. Now I again have recourse to the air-pressure, which seems to drive the medicine deep into the tissues.

In periostitis I prefer to use the cold-air current, which in itself gives relief to the patient.

In this manner the application of counter-irritants, sedatives, and local anesthetics is made easy. With cocain you do not obtain as deep an anesthesia as you do by the hypodermic injection of the drug, but with a four per cent. solution I was enabled to lance abscesses within twenty to thirty seconds without pain, and I have produced with a ten per cent. solution sufficient anesthesia to extract teeth, and did not observe the toxic symptoms which we frequently have following an injection.

In referring to the treatment of disease of the antrum, I will repeat the words of Dr. Frank Abbott, in a paper read before the New York Odontological Society, November 20, 1888: "Here I wish to remark that my first idea of the use of a spray as a more perfect means of medicating the antrum was obtained from Dr. J. L. Mewborn, of Memphis, in 1884. He, however, uses the remedy warm, and applies it by means of a hand atomizer with a single jet. I use compressed air with a pressure of thirty to forty-five pounds to a square inch, and a multiple spray. The pressure forces the remedy into every irregularity of mucous membrane, and the multiple spray reaches all parts of the cavity. This mode of applying remedies to the cavity of the antrum I consider of incalculable service in the successful treatment of many cases."

In the treatment of pyorrhea alveolaris it is absolutely essential that every particle of deposit of whatever form shall be removed, and that the débris shall be thoroughly washed away, leaving no particles to be ulcerated out; to do this it requires a vigorous stream of water.

Dr. J. N. Farrar introduced for this purpose a set of four syringes

with delicate points. I use this bottle, attached to my compressed-air apparatus at fifty to sixty pounds' pressure, which throws a stream with such a force as to entirely cleanse the parts; then I use the Davidson spray tubes filled with pyrozone med., three per cent., and borine, equal parts, which throws out such copious spray that it lifts the gum-tissues away from the teeth, introducing the medicament directly to the seat of trouble, forcing away all foreign particles and giving a clean aseptic condition of the parts.

I employ these spray tubes attached to my compressed-air apparatus for introducing medicine and washing out cavities preparatory to implanting teeth, and I may be concise and say, for all wounds and diseases of the oral cavity.

Having considered the advantages derived from the aid of compressed air upon the soft tissues, I will briefly state the results procured through the medium of this agent on the hard tissues,—the teeth. It is not necessary for me to cite in detail the minute anatomy of the teeth, although a thorough knowledge of the structure of the dentine is requisite to fully appreciate the ideas which I wish to convey. I will therefore ask your attention to a short review of the minute structure of this tissue. A great portion of the tooth consists of dentine, which is composed of an organic matrix richly impregnated with calcareous salts. This matrix is everywhere permeated with parallel tubes, which run, with some deviation, in a direction at right angles to the surface of the tooth. These tubes start by an open circular mouth upon the surface of the pulp, thence running outward, toward the periphery of the dentine, they become smaller and break up into branches at a little distance beneath the surface of the dentine. Near the pulp they are so closely packed that there is little room between them for the matrix, while near the outside of the tooth they are more widely separated. Their diameter is also greater near the pulp-cavity.

These tubes are subject to slight varicosities, and their course is somewhat interrupted by a small interglobular space. Each tube is occupied by a soft fibril, which is continuous with an odontoblast cell upon the surface of the pulp; of their real nature some doubts have been entertained, but I will not occupy your time by citing from different authorities.

These fibers cannot be considered nerves in the ordinary sense of the word, but there cannot be any doubt but that they are media for the transmission of sensory impressions from the dentine to the pulp,

and that the peripheral sensitiveness can be allayed by local applications.

Drs. Harlan, Kirk, and Truman demonstrated by experiment that there is an absorption of liquids by osmotic action. The former states that "thymol will diffuse in moist dentine in from three to six hours at 98.4° F.; that non-coagulants, soluble in water, diffuse readily through tooth-structure, as has been shown repeatedly in experiments outside of the mouth; that oleaginous non-coagulants pass through the structure of a tooth quite slowly in the presence of water in serum albumin, and that the vaporizable portion of an essential oil will give to a substance which it permeates the characteristic odor in from three to six hours."

Professor Truman and Dr. Kirk show by experiments that coagulants will penetrate the tooth-structure, and Professor Truman states "that in proportion to the coagulating power of the agent will be the penetrating force independent of gravitation."

These statements have awakened the profession and provoked no little discussion, although the controversial period is usually only a passing and never the most fruitful period of any new truth. After a science has gained a recognized footing, it has before it its real work to do. The question arises, What can you demonstrate?

These gentlemen have established the fact that medicines will be absorbed through the tubuli *after a certain length of time.*

Now, you will remember that the glue-yielding portion of a tooth contains water to about two per cent. of the weight of the entire tooth; bearing this in mind, let me ask you, my colleagues, what can we accomplish, after dehydration of the tissue, leaving entirely out of consideration the capillary attraction of these infinitesimal dentinal tubes? It has been demonstrated that when the water is removed from a tooth, the normal function of transmitting impressions seems to be modified. This desiccation can be accomplished by several agents: heat, cold, and chemicals.

We know that heat or cold will produce pain, and in the application of either we should proceed with extreme caution.

I use a hot-air syringe similar to the S. S. White's No. 30, only it has twice as large a cylinder. The chamber is filled with carbon, which is found to be one of the best materials for retaining caloric, and only requires a few minutes over a Bunsen burner flame to accomplish the requisite amount of heat. As I wished to employ an electric hot-air syringe instead of the aforesaid appliance, I had Mr. George

M. Wheeler, of the Electro-Therapeutic Company, manufacture this instrument. As I left the city ere its completion, I was unable to experiment with it. By your permission I will read an extract from Mr. Wheeler's letter dated July 28, 1895, which will explain its advantages. He states the following :

"The electric hot-air syringe works beautifully,—I have both bayonet and syringe point attachment. When working the casing does not heat perceptibly, while the air from the point is so heated that it will drive the mercury from 70° to 120° F. in twenty seconds. If I held the thermometer before the current of air any longer than twenty seconds it would burst, as that was its limit. I then took the thermometer away and allowed the syringe to work for a ten-minute stretch, at the end of which time the casing was not at all uncomfortable to hold in the hand. My opinion of it is that it is a 'daisy,' and the only practicable electric hot-air syringe."

With these syringes attached to the compressed-air apparatus, you can so regulate the flow of air that in from one to five minutes you have the tooth thoroughly dry ; then introduce the medicine heated to about 95° F., again apply the warm-air current with about forty pounds' pressure, and you will be able to excavate the tooth without pain, nor will you have any subsequent irritation. With this method it is not necessary to employ acids in introducing cocain, nor is much of your valuable time wasted for the absorption of the medicament. You can also spray medicine into a tooth, but I would first advise the dehydration of the dentine.

In the bleaching of teeth, I find that by the application of hot air at a high pressure I am able to produce the required condition in one-half the usual time, as I can rapidly evaporate the pyrozone twenty-five per cent. and force it into the tubuli. It is necessary to be cautious in bleaching teeth so as not to get them too white, as you will frequently observe them somewhat lighter colored on the following day.

In making a tooth perfectly aseptic, the same method of applying a drug that I have recommended in inducing anesthesia will give a reliable aseptic condition of both tooth and root.

For drying out root-canals use this small point on your syringe, and you can carry heated air directly in the canal, and with a high pressure can force the antiseptics through the canaliculi and tubules, rendering the tissues thoroughly aseptic.

In setting in pivot teeth, we often find it very difficult to carry the cement to the upper portion of the root. In forcing it into the root-

canal with a dry instrument, upon withdrawal of the latter the cement is found adherent to it and not to the walls of the root; but with a high pressure you can force it into every irregularity of the root, while at the same time the compressed air will dry all the surrounding tissue, and you avoid the necessity of wiping away the moisture excreted by the mucous glands.

Ladies and gentlemen, I will not occupy any more of your valuable time in enumerating the many advantages these appliances have over the ordinary hand-pressure instruments, but will ask you to try them, and I am certainly satisfied that you will never regret having placed this apparatus in your office.

SECTION III.—Continued.

Cataphoresis for Obtunding Sensitive Dentine.

PAPER BY HENRY W. GILLETT, OF THE SECTION.

DR. HENRY W. GILLETT. When I read a paper last week before the New Jersey Society on this subject, several gentlemen, in some unaccountable way, understood me to claim cataphoresis as a new discovery. Please do not impute to me any such thought. Dr. Peterson's article, to which I refer, will give you the whole history of cataphoresis, going back to the first experiments in 1858 or 1859. I have not attempted to quote those historical experiments, believing your time to be too valuable to employ in that way. What I have to tell you concerns cataphoresis in living dentine, and aims to be a plain statement of facts only.

Quite recently our dental journals have contained references to cataphoresis as an aid for bleaching discolored teeth, but for several years there has been complete silence on the score of a much broader field which is open to it, namely, the prevention of that suffering which has given us all so many uncomfortable hours in our professional lives, and made many of those suffering under our ministrations feel that the torture-chambers of the Spanish Inquisition would be a welcome relief.

Is there any one pain that has been more dreaded by the civilized race than the pain from the sensitive tissues of the human tooth, when it becomes necessary to treat those tissues surgically?

Is there any one object for which our profession has sought more earnestly, and less successfully, than it has to find a generally applicable means for preventing this pain?

We have striven unceasingly with caustics, with desiccants, with anesthetics both local and general, with administration of drugs and

applications of washes, but with all our strivings we hear it constantly reiterated in our discussions, that the keen excavator and the firm touch are our main reliance.

We have been able to soften the blow sometimes, but very generally the profession seems to have come to feel that prompt and heroic measures are best, and have prepared themselves for action on these lines.

In common with the rest of the profession I have many times had cause to be grateful, in individual cases, for some of the above enumerated aids, and I would by no means discredit the bridge when it has safely carried me over a chasm ; but, after many trials and many failures, my sense of relief in having a means for the control of sensitive dentine which seems to be universal in its application, and the relief afforded to some otherwise untreatable cases has been so great that I am anxious to have the knowledge of the success of this method more widely spread than it now is, to the end that human suffering may be made less. As I have intimated, in my own practice this step in advance has been made by using cataphoresis.

So well recognized an authority as Professor W. J. Morton has recently defined cataphoresis as meaning "the movements of fluids, together with the substances they may hold in solution, from the positive pole of electrodes conveying a continuous current in tissue, toward the negative pole."

Dr. Frederick Peterson opens his article on cataphoresis in Bigelow's "International System of Electro-Therapeutics" with these statements: "From a medical standpoint we understand by cataphoresis the introduction of medicaments by means of electricity into the body, through the skin or mucous membranes. It seems to be a purely physical process, and has nothing to do with electrolysis."

I would add to this definition, so as to include the teeth as a point of entry. The current, then, carries with it fluids exposed to its action under suitable conditions. Here is the missing factor which shall enable us to carry our local anesthetic into the dentine, as it has never gone before,—the beneficent force which has already done so much for us in other fields, which we may again harness for our needs, and make it carry with it, at our command, the cocain solutions we have so long tried to coax into the dentine.

Reference should also be made to an article on this same subject by Dr. D. F. McGraw, in the *Dental Review* for 1887 or 1888, and one by Dr. A. C. Westlake, in the *Dental Cosmos* for November, 1892.

I learned of Dr. McGraw's article too late to consult it, or even find just when it appeared. Dr. Westlake's article contains very little information.

Professor Morton's recent article in the *Dental Cosmos*, describing in detail experiments demonstrating the process of cataphoresis, make it unnecessary to go over that ground again.

When cataphoresis is used on the *living* tooth, however, it is inadmissible that anything like the current strengths which Professor Morton found necessary for bleaching should be used.

Professor Peterson's article contains many points of interest, but I will not take your time to quote his experiments, preferring to quote some cases from practice, showing what may be done in the sensitive tooth.*

How shall we use and control this power, so ready to aid, yet so prone to escape us if we do not guard it? It must be *fully* under control.

Apparatus which may be used for cataphoresis at other points is of little use in the living tooth, because the living tooth is much less tolerant of the current. It responds promptly to currents imperceptible in most other tissues.

The apparatus must be so arranged that we may begin by applying an imperceptible current, and increase it by minute gradations till we reach a point enabling us to attain our object. This point need not be high; a fraction of a milliampère actually passing through the tooth for a sufficient length of time will accomplish the purpose. If, however, the subject is not too sensitive to the influence of the electric current, one to two milliampères will do the work quicker, and even three or four may be reached in individual cases without discomfort to the patient. This quantity of current is reached in only a small proportion of cases, however. Note that the quantity of current specified is that actually passed *through* the tooth; the capacity of the apparatus needs to be much greater in order to force this quantity through the tooth and other tissues.

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*At this point the essayist quoted Dr. Peterson's summing up of his experiments with cataphoresis (which had been kindly furnished him by Dr. S. Freeman) as follows:

"The current alone does not produce anesthesia at either pole, although the anode has a transitory soothing effect over painful foci. A watery solution of cocain applied to the skin is not absorbed, does not produce anesthesia, except, perhaps, after an indefinitely long period. A watery solution of cocain *is* diffused through the skin and subcutaneous tissues by the anode, but not by the cathode."

The source of current may be any of the commonly used commercial electric power systems. The current used by the essayist is the Edison 110-volt, and this particular adaptor, or fractional volt selector, is suited to that current.

The manufacturers, "The Electro-Therapeutic Company," 32 East Twenty-third street, New York, say they can furnish equally satisfactory appliances for any system, or supply suitable batteries, if other sources of power are unavailable.

One of the most essential points to practical success is to begin with a current too weak to cause any annoyance to the patient, and increase it as the patient will permit. As the cocain begins to penetrate, the current will be felt less, and may be increased without discomfort for the patient.

The minimum time for application has been, so far, six to eight minutes; many cases require more time, and these can only be discovered by testing the cavity. By long applications a tooth may be so benumbed as to allow it to be cut to pieces without pain, if it is desired to do so. In using, apply current gradually, avoid sharp

changes in quantity or voltage. When application is completed, decrease the current in the same way, as a sudden cutting off will result in some shock to the tooth.*

Never allow the current to pass through a metal filling to the tooth, as this causes pain. Insulate such fillings when necessary with gutta-percha. Twenty to thirty per cent. solutions of cocain prove satisfactory for use in sensitive dentine.

The effect seems to penetrate but a short distance at first; if this layer is cut through, a second application may be made.

Always apply the platinum-pointed positive electrode to cotton in the cavity saturated with the obtunding solution. The negative wet-sponge electrode may be applied anywhere on the surface of the body; the neck or the face is a very satisfactory place for applying it.

It is desirable that the current should have as short a distance as possible to travel through the tissues. Theoretically, the mucous membrane of the mouth would be a good place for the negative electrode, but it is less easy to prevent leakage of current when it is placed there, and its application at that point is more disagreeable for the patient.

I have confined myself, in the foregoing, to statements of what I have actually accomplished in my own practice.

I believe the field in which cataphoresis can most frequently and best serve our profession is the one in which I have been working. My experience with it in this field, however, leads me to expect that its applications will be numerous. For instance, it is as yet an open question in my mind whether I will attempt to treat the next case of sensitive dentine, exposed by abrasion, that presents itself to me, by cocain cataphoresis followed by actual cautery, or by cataphoric applications of caustic solution to those surfaces.

I anticipate being able to treat pericementitis, incipient abscess, and chronic abscess without fistula, by forcing antiseptic and stimulant applications to the seat of trouble by cataphoresis.

May we not be able even to treat irritated and inflamed conditions of the dental pulp itself by this means? To me it seems a reasonable probability, and to present an attractive field for experimental research.† It has enabled me to say to my patients that I can

*This is found to be unnecessary with the latest improved selector.

†Since writing the above, my attention has been called to a paper presented before this Association and printed in the Transactions for 1891. It was pre-

prevent all pain in preparing sensitive cavities. Gentlemen, I commend this method to your attention.

With your permission, I will quote a few cases from practice.

Case A, Mr. N., aged twenty-five, right superior second bicuspid, cavity quite sensitive. Treatment, cataphoresis for ten minutes with twenty per cent. solution cocain, not quite one milliampère of current passing through the tooth at the end of treatment. Result, absolute freedom from sensitiveness to excavator or bur.

Case B, Mrs. H., aged forty, left superior bicuspid, large approximal filling, history and contemplated treatment such as had led to a decision to destroy the pulp. To do this it was more convenient to approach the pulp through the anterior cavity. The dentine was found too sensitive to permit drilling. Cataphoresis for fifteen minutes with thirty per cent. cocain, then drill directly to the pulp, which was found much receded. The first notice that the pulp had been reached by the drill was from hemorrhage, and not from pain. In this case a further application was made and pulp removed painlessly.

Case C, Mr. C., aged thirty, left inferior second molar, very large corono-mesial cavity. The patient refused to allow shaping of cavity, because of sensitiveness. Cataphoresis for fifteen minutes with twenty per cent. cocain. Result, entire freedom from sensitiveness, except in one corner near cervical margin.

Case D, Willie M., aged thirteen, mesial cavity in inferior first molar, very sensitive. Cataphoresis with thirty per cent. cocain for ten minutes. Result, complete anesthesia of dentine for some distance, but a second application for six minutes was needed for shaping the retaining grooves.

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sented by Dr. John S. Marshall, and was entitled, "Electricity as a Therapeutic Agent in the Treatment of Hyperemia and Congestion of the Pulp and Peridental Membrane." It deals rather with the effects of the current itself than with the results obtained by cataphoresis.

SECTION III.—Continued.

Evolution in Operative Dentistry from the Electro-Chemical Standpoint.

PAPER BY S. B. PALMER, OF THE SECTION.

MR. PRESIDENT AND MEMBERS OF THE AMERICAN DENTAL ASSOCIATION:

The paper read before this body at the last meeting entitled, "Etiology of Dental Caries," was intended to be my last contribution to dental literature upon this subject.

The discussions which followed gave evidence that the writer was not understood; or, at least, that his ideas were not clearly set forth. They were discussed as being antagonistic to a phase of caries which is scientifically correct, and so acknowledged by the profession. This unwarranted misconception, together with the declaration that the electro-chemical theory had not been proven, that something more definite must be presented which could be demonstrated before scientific bodies, followed also by the statement that that theory has no ground to rest upon, we deem of sufficient importance to demand that we state the doctrines included in the theory, and the evolution which their application has effected in *one* practice, without claiming any credit for influencing practice generally.

Success attending any operation comes under the law of Cause and Effect, whether the knowledge was gained from science, clinics, or experiments.

Success being an effect, we search for the cause; having determined that, we have a principle which, if observed, will under the same conditions produce the same effects. It has been a study of many years to discover principles in operative dentistry which may be defined and so demonstrated that young dentists who can manipu-

late filling-materials well may operate with an assurance and success not otherwise attained short of years of experience.

We hope to impart such knowledge at least sufficiently to convince members that the electro-chemical theory stands upon a scientific basis.

We receive the criticism to the contrary kindly, and will answer it fairly in a practical manner, to do good to those in search of knowledge. It is true that we cannot demonstrate our teachings before a body of men with instruments any more than one could use instruments to demonstrate before a convention the culture, development, or destruction of micro-organisms.

It having been stated that the principles under discussion cannot be demonstrated before a scientific *body*, we are not discouraged. We present it before a *section* of experienced and practical members, and are willing to rest our case there.

Twenty years ago we introduced the principles which we now offer. Dental science at that time was crude as compared with the present, and practice was supported by prejudices, whenever principles seemed to conflict. It seems pretty well settled that evolution in practice must follow in the path taken by medicine and dentistry thus far, which is practice first, gained by empiricism, followed by science.

Science now underlies practice, and the principles of science observed will furnish positive results. There is no need of our young men waiting years to gain experience, when a few well-defined laws may be learned and applied to a degree that results of operations may be correctly predetermined, affording a short scientific route to success in operations.

In speaking of evolution, let it be understood that we do not intend to present the progress which has been attained in general practice, nor do we claim that the theory mentioned has been the cause of such progress. We desire to give the outcome of twenty years' experience in saving teeth in a private practice, which has been conducted according to the principles which we now define.

To show the advancement which has been made, I will first notice what practice was forty years ago. This was during the "amalgam war," when the line of respectability was drawn between the use of amalgam and gold. Living as I did within twenty miles of the late Dr. Amos Westcott, who was active in voting for the expulsion from the Society of Dental Surgeons of all members who used

amalgam, I naturally used it sparingly, having a desire to maintain a respectable standing in the profession. In regard to amalgam, evolution set in immediately on the breaking up of the above-named association. In 1864, nine years later, I entered Dr. Westcott's office as a partner, and by him was taught to use amalgam with perfect freedom and to a degree that I had never done before.

In a meeting of this Association in its early days, Dr. L. D. Shepard, of Boston, in discussing the merits of tin, said, "Tin possesses some antiseptic properties for the preservation of teeth that gold does not." This it was that first directed my mind to commence a study to find out what that property consisted in. Having, as I believed, determined the cause, the results were given to the Dental Society of the State of New York in 1874. The investigation also awarded like antiseptic properties to amalgam; but the prejudice against this filling was so strong that it was deemed best not to include or recommend it in that connection.

It will be remembered that at the meeting last year a request was made that more clinics and practical papers on operative dentistry be given. This was answered from the other side, that the American Dental Association should be a scientific body; local societies should teach practice and give clinics: this Association should not become a kindergarten. We cannot conceive of any act more fatal to the growth and prosperity of this Association than such a division of attainments.

Dental practice is the first degree in the profession. Dental science is the highest. Exclude from this body the energy, aspirations, and young blood of practice, and the remaining membership would soon become distinguished for their choice of front seats, and not less for the color and parting of their hair.

In filling there are two conditions which menace success: first, low grade of dentine; second, indiscriminate selection of filling-materials, or defective manipulation. Normal dentine, and grades higher than normal, require nothing more of a filling than the exclusion of liquid circulation. Of course this does not refer to the durability of the filling. We have no other material to compare favorably with gold for this condition of dentine. Thus far we have regarded normal dentine as it is usually pronounced, as *not* an electrolyte.

The second condition embraces electrolysis to a degree in that it includes a low grade of dentine,—poorly calcified teeth,—which *is* an electrolyte in proportion as it admits of fluid circulation. We invite

your attention to this class of teeth, while we offer practical suggestions which may be helpful. It is a law in nature that gold fillings cannot preserve teeth of this class without the help of some other material to take the place of the mineral element lacking.

Decay around gold fillings under the conditions referred to is an effect which even perfect manipulation cannot prevent. Whatever view may be entertained as to the origin of the acids which dissolve the lime-salts, exclusion is the remedy, as the baneful influence of micro-organisms and electrolytic decomposition depend upon molecular mobility.

When the antiseptic properties of metals were first spoken of, tin was taken as an illustration because its virtues were established, while amalgam, which also afforded like properties, was not mentioned on account of the prejudices then existing against its use. Discussion soon brought amalgam to the front, which was deemed sufficient cause to condemn "the theory," without scientific investigation. To-day most of this prejudice has been removed, and amalgam is recognized as a filling-material for preservation of teeth.

The electro-chemical theory still exists, and is brought to your notice under scientific rules whereby various filling-materials may be adapted to the conditions of the dentine, which rules we hope to illustrate and demonstrate by cases in daily practice; thus teaching applied science in operative dentistry.

I have already mentioned that normal dentine is not classed as an electrolyte, and that gold may be safely used in it. The line is not drawn absolutely on what analysis calls normal dentine, but as the grade falls below the normal in like proportion will gold fail to meet the demands without supplementing it with that which it has not.

Having mentioned tin, let us see what properties it possesses for preserving teeth. First, it is softer than gold, and is generally more easily adapted to the walls of the cavity; therefore an inexperienced operator would be more successful with tin than with gold in filling normal dentine. In the lower grades the moisture in the dentine oxidizes the metal, the stannic oxid fills the tubuli and the rough surfaces of the dentine with an insoluble lining. This oxid being light colored does not stain the dentine or enamel. The application of this principle to amalgam presents complications as follows:

Amalgam has within itself the elements of its own deterioration, which can be illustrated by copper amalgam, or other amalgams which contain two metals, mercury being one of them. The fact

that some copper amalgams turn black, remain smooth on the surface, do not shrink and do preserve teeth, goes to prove that there is affinity between the copper and the mercury to the degree that a perfect compound is formed; that is, an atom, or atoms, of one metal unite with a given number of the other, thus protecting and preserving each other.

Another fact, that other fillings in the same mouth, perhaps made from the same amalgam, turn brown, showing that the mercury has been dissolved or remains bright and soft on the surface, as clearly proves that there is an excess of one of the metals, which exposes the plug to galvanic action, resulting in the final destruction of the plug. Copper amalgam must be unreliable until perfect knowledge is obtained for its proper composition and manipulation.

It affords me pleasure to quote from Cassidy's "Dental Chemistry" in support of the principle which is involved in the above, and which will follow in the composition of other amalgams. In speaking of tin, on page 171, he says,—

"The high preserving qualities of tin, in this connection, are doubtless due to the formation between the filling and the walls of the cavity of the insoluble stannic oxid, and when with gold in addition to this an electrolytic mutual induction continues between the two metals, like that which exists in and preserves galvanized iron (iron and zinc)."

I am desirous that this principle should be understood, as it is important in making alloys for amalgam and in compound fillings where two metals are used in connection. Galvanized iron may be cited. In this it may be seen that after the zinc, which is the positive element, has been dissolved almost out of sight, there remains in connection with the iron an alloy of zinc and iron. That is, the iron has protected a portion of the zinc, while the zinc so protected raises the mass of iron above its normal standing to resist oxygen. As a practical point it may be noted that when tin and gold are in contact in the mouth, as in a compound filling, there is no separation at the joint; and the same is true of amalgam and gold, because atoms of gold form an alloy with the metal in contact with it, and that alloy is the solder at the joint; the two fillings are united, and the solder containing gold is finer than the tin or amalgam, and would be preserved until the mass was entirely dissolved. This is quite different from joining two amalgam fillings, as all have noticed that two such fillings separate or show a line at the junction. This is due to the fact that the sol-

dering in this case is coarser or contains more mercury than the filling on either side. Should a single thickness of gold foil be placed in the joint, that would be the last portion to be dissolved.

Another point. When gold and tin are combined for guard fillings, when only a few layers of tin foil are used, all over one or two thicknesses of the tin, which is in contact with the gold, will be dissolved and become a black metallic paste. The same law is observed here. The gold does not enter into composition with the tin only as mentioned. This leaves a few thicknesses of tin foil exposed to the action of the gold on the one side, and the moist dentine on the other, and not having a mass of tin to back it, as in the case of a tin filling, dissolution is the result. So it is better to use a thin lining in connection with gold, or make it quite a portion of the filling. Either plan works well, as no tin will be dissolved.

This law is so much to be relied upon that large fillings can be made with gold and tin, which become as hard and durable as amalgam. Only this precaution must be observed: The tin and gold must be used in alternate layers in order to give a smooth filling. Too much gold will do no harm, only to show gold stripes; but tin, in excess of the thickness mentioned, will be dissolved, leaving pits upon the surface. I should say that these changes only occur as the filling is wet. The filling is always hard, and so would the plug be if the filling had been done wet; but on cutting into such a filling the two metals are found distinct, only becoming alloyed on the surface.

There is no disagreement in my mind with the belief that where decay has advanced around gold fillings to a degree that the margins are so imperfect as to admit external liquids, the same causes are found there as are found in primary decay. I wish, however, to stand on record as believing that acids are furnished beneath gold fillings by electrolytic action, independent of the action of ferment organisms, and that, too, even when the margin around the filling is perfect.

This belief is based upon study and observation in practice for twenty years. The benefit of this knowledge consists in knowing that perfect manipulation of gold will not prevent the decomposing energy from passing through the filling the same as heat or the electric current. Many young operators have made sad mistakes in attempting to work against natural laws. There is some excuse for them when students are taught that no such principles exist; but this does not compensate the loss of teeth to patients, or the injury to the

reputation of the operator. These facts are becoming known, and show the error of such teaching.

Before offering remedies to overcome this decomposing energy, let us seek to comprehend the process by which the injury is accomplished. First, in filling low-grade dentine with gold the metal is placed in contact with living organic tissue. The result is devitalization of the surface, which, of course, destroys sensibility. This action is due to thermal changes. Does this do harm? Not unless the dentine is an electrolyte or non-conductor. When it is a conductor, devitalization continues by electrolytic action, the current being communicated through the filling in the following manner: Bear in mind that gold in the mouth is charged with electricity, be it a filling, crown, clasp, or plate. This charge is called electric potential. That is the condition of the plates in a galvanic cell when they are disconnected. The degree of potential is determined by that which is in the mouth at the time. Saliva, the liquid which nature has provided, is so compounded as to be nearly neutral as to acid or alkali, and yet, unlike water, it is unstable, or easily decomposed by affinity for other elements taken into the mouth as food.

The delightful sensation of taste is due to chemical action upon saliva. Acids, sweets, salts, carbon, etc., each, in drinks or food, play a part during mastication or deglutition, and the sensation is the result of electric currents. Electricity proper belongs to the mineral kingdom; that is why currents generated by galvanism are not pleasant to taste, nor are the elements from which such currents are generated nutritious as food.

Dentistry has to do mostly with organic chemistry. The greatest difficulty seems to be that there is no accepted authority for my own belief that in the mouth there is found a continuity of electric laws, the same as those known in a cell. In the mouth much is organic: the current is organic, and the elements also which produce the current are of the same nature. As proof, take coffee, steep it without roasting, and who would drink it? Roast it, and it is palatable. Why? Because carbon has been added,—nutritious carbon,—and that becomes an element which is a negative plate, so to speak. All know that it thins or decomposes saliva; add sugar, another element which gives another taste. Broil meat: carbon has been added, which is, in contrast with other portions, more rare. Chlorin also acts easily upon saliva. It is used as chlorid of sodium in connection with vegetable carbon. Almonds are roasted and salted. Peanuts

are thus treated; pop-corn likewise. From these examples it must be seen that all the elements of food must be nutritious condiments. The roasting does not reduce the carbon to a mineral. Burn your coffee, almonds, peanuts, corn, or meats, and nature rejects the carbon. We cannot thrive on minerals. In this there is a deep study, and it belongs to dentistry to bring it out. With poor advantages and little help from books, and with no little opposition, years of study have done but little; but the study will go on, and in time electro-dental chemistry will be recognized and included in dental studies. Then the medical chemist will not fill the demands of an up-to-date dental college.

During the mastication of condiments, or the drinking of liquids like soda water, all gold in the mouth is raised in potential, and, being in contact with the mucous membrane of the mouth, tongue, etc., the potential, or charge, runs down. During the time any condiment of contrast with saliva, acid fruits in particular, is in the mouth, the current passes from the gold into the decalcified or poorly calcified dentine beneath the gold. This is what is meant by decomposition by acid direct by electrolysis. Again: when such fillings leak, and receive external agents, decay is more rapid than it would be around a filling of gutta-percha equally leaky, because the two agents, external and internal, work in harmony for decomposition.

We have already considered the action of gold and tin when in contact with low-grade dentine. We now take up amalgam made from alloy which contains two or more metals. Amalgam is not a homogeneous mass; even after it has hardened it contains particles of alloy in filings, which contain less mercury than the greater portion which is thoroughly amalgamated. The effect is to set up local currents upon the surface of the plug. The portion containing the most mercury is dissolved first, leaving the particles with more alloy in sight, and giving a granulated or roughened appearance to the filling.

When amalgam is placed against the walls of a cavity chemical action takes place at once, by reason of the moisture in the dentine. The compound which is formed by the salts of the metals in combination with the organic portions of the dentine is insoluble, and, not being decomposed, no acids are furnished to further dissolve the lime elements of the dentine. Others contend that this compound is antiseptic and thus prevents the formation of acids. Please take your choice. We are working for the best practical results, and not to defend or antagonize theories.

Amalgam fillings are said to shrink after several years. Perhaps the most prominent reason is that when the surface action under the filling is so rapid that the metallic salts are held in solution to a degree that they do not fill the dentine, acid is a result, and that not only dissolves the lime but also dissolves the surface of the plug, and thus it shrinks and leaks. This occurs more frequently among high-grade amalgams. Copper is added to furnish oxid more abundantly. To overcome this tendency I frequently line large cavities with tin foil, which is easily done by laying tin foil over the cavity and pressing it down with a burnisher. The amalgam will cut the tin even with the enamel, so that no tin will be exposed. There is this advantage in such linings: The metal in contact with the dentine is tin amalgam, which does not discolor the teeth; and, on the other side, the tin blends the two elements mentioned in the amalgam, which prevents local action and shrinkage.

These are the principles which were laid in the foundation of the theory under discussion. Evolution, however, has its date from the start, running through practice to the present time. To avoid the charge that methods herein recommended have been used by others, I confine my illustrations to my own practice,—what it was, and what it has become, as an embodiment of knowledge gained from any and every source. Lining cavities with varnish of various kinds has been recommended for fifteen years or more. It had been tried in my practice several years previous to writing the article which may be found on page 256, vol. ii, of the "American System of Dentistry,"—"Electro-Chemical Relations of Stoppings to the Teeth." Why a matter of so much importance in practice as that of filling the surface of porous dentine with some substance which will close the tubuli and unite with the filling, so as to exclude the moisture, should have received so little attention, is beyond comprehension. The following are some of the benefits of such an insulator and non-conductor:

When sensitive dentine has been dried, the surface is not sensitive. Fill the dentine while dry by varnishing or by melting in paraffin. Sensitiveness under such conditions does not return as it would, when by capillary attraction moisture returns to the filling.

Again, this coating is not a metal, and vitality is not destroyed by contact with it. To show what occurs under the fillings with the cavity thus varnished, the day on which this was written a patient called to have a central incisor refilled. The corner of a large con-

tour filling had broken away, although most of the gold remained. On its removal the last piece, which was the anchorage, and was made of a cylinder, came away, leaving the cervical portion of the cavity lined with one or two thicknesses of gold foil. This lining was bright, and firmly cemented to the dentine. As soon as the excavator passed over the surface the gold remained bright in the smallest depressions until the entire surface was cut away. The varnish was used only one-third of the depth of the cavity, that is from the cervical border to the cutting-edge.

One word of caution: Do not varnish enamel where contour work is to be done. It does not require it. Besides, varnish prevents the fine mechanical friction which gold has on enamel. In this connection I will say that when heavy varnish is used under amalgam, the fillings remain bright on the hidden surfaces, showing that there is no leak. Knowing this, I have not for two or three years used any amalgam alloy which contains copper. Consequently teeth are not blackened, and upon masticating surfaces the fillings remain the same as tin in color.

It is generally conceded that decay is the effect of acids upon the lime. It matters not what the origin of the acid may be. In practical work, exclude the moisture and chemical action ceases. There are cases in which phosphate fillings are greatly benefited by protecting the dentine from the exciting effects of acids.

The benefit derived from varnish in connection with gutta-percha is not appreciated by those who are not familiar with it. When cavities have been varnished and dried with hot air, each piece of gutta-percha remains fixed under pressure, and when the filling is completed so firm will it be that the surface can be cut away without drawing the filling from the walls of the cavity. No moisture or fluids remain between the filling and the dentine, as the gutta-percha forms a combination with the balsam, which penetrates the dentine and there remains. This is a simple yet valuable process. Try it.

Some fifteen years ago Dr. F. E. Howard, of Buffalo, gave a clinic on what was termed anchoring gold fillings with varnish. In discussions later the idea was ridiculed and regrets expressed that one of the known ability of Dr. Howard should advocate "sticking in gold fillings with varnish." I think that prejudice has prevented many from using a valuable aid in filling cavities of a specified character. We are now seeking knowledge how to save teeth, time, and money.

Disregarding the admonition of friends in regard to advocating this condemned practice, I will briefly give my own, limiting it to a *single cavity and location*, although practically it is not so limited. Take for illustration a superior central incisor, large labial cavity of crescent shape and very shallow. Preparation,—have the margins of the cavity well defined, no matter how shallow, so that the cavity is at right angles or slightly undercut. If cavity extends to the gums, excavate slightly under so as to hide the line which would be visible where the filling touches dentine. Take Watt's Crystal Gold, No. 1, or the softest, divide it into small pieces, anneal on mica or metal, also fold gold foil into thin narrow tape, suitable for surface finish. Dry cavity, gums, undercuts, and overlapping gums with warm air. Place a pledget of cotton between the teeth on either side, and napkin around the teeth on the gums above the cavity. Varnish gums, cavity, and cotton between the teeth, remove excess of varnish with bits of kid leather which leaves no fiber. Pack gold around margin and cover the bottom of the cavity; produce an even surface, upon which build up and finish with foil laid on in flat strips. When such a filling is finished, nothing can be more perfect. No moisture beneath, no wounding of the gums by clamps, no fear of getting wet or filling coming out. In short, it is filling made easy and perfect.

The application of electric power for commercial purposes introduced the live wire with its disastrous effects. Crowns and bridges with their gold mountings being anchored to crowns and roots, convey to the nerve-tracts electric disturbances which patients cannot intelligently describe, and which are also as difficult for dentists to scientifically diagnose.

But for a combination of circumstances which has led to the study of oral electricity, with demonstrations in my own mouth, I could not have understood what I will attempt to describe for the benefit of dentists and patients who may apply to them for relief. One case of special interest came up within a year. A young lady had a bridge inserted some two years before, which was anchored to the first lower left bicuspid and extended to the second molar. From the first the gums around the gold bands and the necks of the teeth became sensitive. The only permanent relief came from using nitrate of silver. There was every appearance at first sight that the gold impinged upon the periosteum and thus caused mechanical irritation, but this was not the case. This condition is often met with, and

others must have observed like appearances. Let us get a distinct idea of the cause in order to understand another phase of disturbance brought to light by this case.

As stated in a foregoing page, gold in the mouth during periods of chemical activity—which is during mastication, at which time saliva is mixed with food, as also when acid, as in fruits and drinks, is mixed with saliva—is raised in potential, or becomes charged with electricity. The gold conducts the current to the gums at the necks of the teeth where it passes into the tissue, which gives the flesh the bluish-red shade often seen in gums between fillings at the cervical margin. This also is caused by electrical action. Do not lose this point by supposing that the current is due to the different relations between the fine gold and sixteen-carat solder. It is the same as in a battery where a platinum plate is used for the negative. It is not effected by the fluid, but simply receives the electricity generated in the liquid and discharges it by the best conductor and by the shortest circuit. It is not enough to charge irritation and sensitive dentine at the necks of the teeth to the acid used in the cement. It is the effect of decomposition by the current which is directed to that point by a gold conductor.

To apply this principle to the new disturbance. The upper teeth which articulated with the bridge were filled with gold, some of which was contoured to come in contact with the gold below. First complaint was made of a large coronal filling in the first molar; could not masticate meats, etc. The filling was removed. Dentine beneath was softened upon the surface and sensitive, — nothing very unusual. The cavity was filled with gutta-percha, and no trouble followed. But before the patient left the city that day, she returned with a similar complaint of an approximal contour filling in a bicuspid, which, by removal of the first filling, came in contact with the latter. The dentine showed no signs of decay. The same treatment gave relief. In like manner three others have been removed, two of which did not come in touch with and could not have given trouble. So, now, five cavities are filled with gutta-percha. They have been removed by the dentist at the home of the patient. I am soon to replace those fillings with gold, and in the condition in which the dentine will be found, by the use of varnish or paraffin I shall fill with full confidence of success.

Thus have I outlined a practice which has been conducted upon the principles included in the electro-chemical theory. If the

teachings will aid young practitioners in adopting *rules* by which more positive results may be obtained, I shall feel well remunerated. Should any still fail to understand the difference between primary decay and that around metal fillings, or believe that the popular instruction at dental colleges, with few exceptions, contains all that is worthy of notice, of such I ask pardon for having consumed so much valuable time.

SECTION III.—Continued.

Journal Articles pertaining to Operative Dentistry.

REPORT BY H. L. AMBLER, OF THE SECTION.

TITLES and number of articles which have appeared in different journals for the past year, pertaining to operative dentistry. Name and date of journal can be furnished by Dr. H. L. Ambler.

Cocain	2
Nitrous Oxid	3
Chloroform and Ether	3
Gum Lancing	2
Filling Roots with Gutta-percha	2
Form in which Arsenious Acid is best applied for Devitalizing Pulps	3
Implantation of Decalcified Teeth	1
Another Method of Gold Filling	1
Electricity and Painless Dentistry	2
Hypnotism	2
Preparation of Roots for Crowning	2
Filling-Materials of Many Kinds	2
Capping Pulps	4
Bridge-Work	5
Etiology of Dental Caries	1
Correcting Irregularities	6
Syphilis	1
First Permanent Molar	1
Treatment and Filling Pulpless Teeth	9
New Remedies	1
Artificial Crowns	6

Sulfuric Acid for Opening Root-Canals	3
Systemic Treatment of Dental Diseases	1
Facial Neuralgia	1
Penetrating Power of Coagulants	3
Caries and Pregnancy	1
Amalgam	3
Pericementitis	2
Infants' Teeth	1
Varnishing Cavities	2
Alveolar Abscess	2
Predisposing and Active Causes of Caries	1
Decay at the Cervical Margin	1
Crowning Deciduous Teeth	1
Third Molars	1
Position at the Operating Chair	1
Amputating Roots	1
Cementing in Gold Fillings	1
Bleaching	2
Physical Characteristics of Teeth and Filling-Materials	4
Practical Operations	1
Riggs's Disease	1
Alveolar Hemorrhage	1
Non-cohesive Gold Filling	1
Wedging with Rubber	1
Pathological Condition of the Mucous Glands of the Mouth	1
Influence of Diet and Exercise upon the Teeth	1
Porcelain Dental Art	1
Dental Engines	1
Dentistry and Medicine	2
Preparing Cavities for Gold	1
Finishing Fillings	1
Hygiene of the Mouth	1
Shedding Temporary Teeth	2
Sterilizing Agents	1
Oxyphosphates	3
Preventive Dentistry	1
Odontalgia	1
Electro-Chemical Theory of Dental Caries	1
Extracting	1

SECTION IV.

HISTOLOGY AND MICROSCOPY.

REPORT BY I. P. WILSON, SECRETARY *pro tem.* OF THE SECTION.

MR. PRESIDENT AND MEMBERS OF THE AMERICAN DENTAL ASSOCIATION:

Gentlemen,—In the absence of the Secretary of Section IV, I have been requested to make a brief report.

But I must acknowledge that my observations have not been sufficient to warrant me in attempting a careful review of the work that has been accomplished in this line of study since our last annual meeting; nor am I aware that very much original work has been done since that time.

It is with satisfaction, however, that we mention the fact that the valuable researches made by Dr. Bödecker of late years, and published by him from time to time in our dental journals, have been revised and, with some additional matter, published in book-form during the past year.

This work is, indeed, a valuable contribution to dental science and literature.

In looking over the fertile field of histology and microscopy, we find that, although the laborers therein are few, the work is still going on. The past year has been one of careful re-examination of work hitherto done—a sifting of truth from error.

This Section has two papers to offer at this meeting,—one with the assistance of the lantern, which is partly a physiological study of the growth of the teeth and jaws, and a series of studies of the effect of continued irritation upon the dentine and enamel, by the Chairman of the Section; and the other, upon lymphadenitis, by V. A. Latham, of Chicago.

SECTION IV.—Continued.

Development of Teeth and the Effects of Irritation upon Them.

DESCRIPTION OF SLIDES SHOWN IN LANTERN EXHIBIT, BY FRANK ABBOTT, CHAIRMAN OF THE SECTION.

GENTLEMEN:

When the Section upon "Microscopy and Histology" was established in this Association, these subjects were very little understood by the general practitioner of dental surgery, as no college in the country, so far as the writer knows, pretended to teach the use of the microscope, the minute structure of the teeth or of the other tissues of the body. Now, no college is considered properly equipped for correctly instructing its classes that has not a score or more microscopes, a well-appointed laboratory, and competent instructors in these most essential and always interesting branches of study. This advance in the curriculum of the colleges, and the general advance in many other directions, in their requirements and facilities for a more liberal and thorough education of young men who seek to enter this branch of the medical profession, received its stimulus from the American Dental Association.

It may not be generally understood by the members of this Association that the first researches ever conducted in this country, to determine the etiology and progress of the carious process in human teeth, were conducted by the writer in 1878. The same may be said of the study, microscopically, of nearly every pathological condition found in these important organs, except the date. With, I believe, two exceptions, the writer has been Chairman of this Section every year since its establishment, and with two exceptions has had something to offer, for the general good and advancement of our special work, in the field of medical and scientific study. This has taken time and quite an outlay of money. That which has troubled me

most, however, is the little interest taken by those who, it seems to me, should take hold of scientific work with heart and soul. The field has not all been cultivated by any means; there is plenty of room for many yet to distinguish themselves by conducting researches in many directions, in connection with the mouth and its tenants. May I not hope to see the younger men taking hold of these subjects more in the future than has been done in the past?

Last year at Old Point Comfort, I believe I was the only member of the Section present. It may be pleasant to have things all one's own way, but I do not enjoy organizing a Section alone. This making oneself president and secretary and the entire Section, and transacting its business, is anything but pleasant work.

I have but little to offer the Association this evening, but hope that little will prove interesting and profitable. Inasmuch as "Variety Shows" are the order of the day, I have prepared a short entertainment of that kind, which we will now proceed with.

First, I propose to show a series of slides illustrating the development from birth of the teeth, both temporary and permanent, their final loss and the atrophy of the alveolar process and maxillary bones due to the loss of the teeth as observed in old age.

I will begin by showing the skull of a child at birth (Fig. 1), which gives an illustration of what progress has been made in the development of the teeth up to this period. It will be observed that the crowns of all the temporary teeth are nearly or quite formed, which teaches the important lesson that the temporary teeth are free from the imperfections in their structure so often met with in the permanent set, the development of which takes place after birth, and when the child is subject to the local diseases of childhood.

It will be noticed that the root ends of the crowns are situated at about the point where the apex of the root will stand when its growth is completed. The progress of the tooth through the alveolar process and gum is, therefore, caused by the growth of the root, which projects the crown ahead until the tooth is in its normal position.

Second. Fig. 2 shows the growth of the roots of the two central incisors in each jaw to a sufficient extent to have forced them into the mouth. This occurs at from the fifth to the ninth month, the lower incisors usually appearing a few weeks prior to the upper, at about five or six months of age. It will readily be seen that the growth of all the temporary teeth has been considerable since the birth of the child, in addition to which the first permanent molar is seen to

FIG. 1.

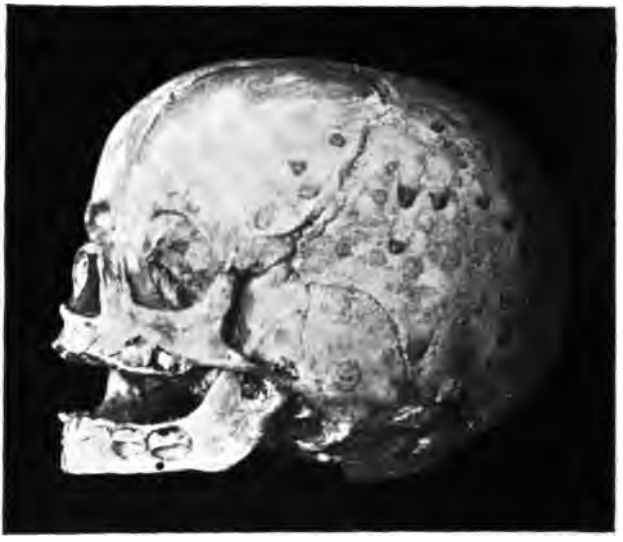


FIG 2.

be somewhat advanced in its development. I would call special attention to an interesting feature, so well shown in the lower jaw of this picture,—viz, As the permanent molars develop or grow in the posterior part of the jaws, the development of the jaw itself must keep pace with their requirements for room. When this growth on the part of the jaw is tardy, the teeth in front of these molars are crowded against and often past each other. The question has often occurred to me whether this might not account for the transposition of bicuspids, cuspids, and laterals, which is sometimes seen.

FIG. 3.

Third. In Fig. 3 it will be observed that the four lateral temporary incisors are in place in the mouth. This is usually at from the eighth to the tenth month. The progress in the development of all the teeth shown in the last picture is seen here to have been very considerable. In addition to the eruption of the four laterals, the first temporary molar is seen to have penetrated the alveolar process and is now only covered by the gum-tissue, and the crown of the second temporary molar, as well as that of the first permanent molar, is considerably advanced in development. It will be noticed that at this period the roots of the central incisors are not yet fully formed, and that the laterals are far behind in their growth.

Fourth. Here we have at least a striking picture (Fig. 4). The first temporary molars are all in position in the mouth. The progress in the development of these teeth has been somewhat less rapid than in the incisors, as the child is now from twelve to fifteen months old. It will be observed that the cuspids and second temporary molars have but little bony covering over them, that their roots have commenced to form perceptibly, that the first permanent molar has made considerable progress in its growth during the past four or five

FIG. 4.

months, that the roots of the incisors are still short of perfect development, and that the jaw itself has grown markedly, so that the crowded appearance of the teeth seen in the last picture has been relieved.

Fifth. At the age of about seventeen months the conditions as presented in Fig. 5 are in order; the cuspid having taken its proper place in the mouth, the appearance of the child is much improved. Here it will be observed that the roots of the incisors are quite perfect, those of the first molar and cuspid far advanced toward perfection, those of the second molar progressed toward

completion very considerably, and the crown of the first permanent molar quite completed.

If it has been especially noticed by any present they will have seeu the steady growth, not only of the jaws themselves, but of the crowns of the teeth, antero-posteriorly, from the first picture shown up to the present one, indicating that layers of enamel are constantly being built upon the sides of the crowns, until their full growth is accomplished. It will also be observed that very little change has thus far

FIG. 5.

taken place in the ramus of the jaw, and that the second temporary molar has penetrated the alveolar process and now has nothing but gum-tissue over it.

Sixth. We see in this picture (Fig. 6) at the age of about two years the temporary teeth all in the mouth, the second temporary molar having completed its growth, and the roots of all of them quite perfect in their structure. The first permanent molar, it may be observed, is beginning the formation of its roots. It will also be seen that the crowns of the permanent incisors, cuspids, and bicuspids have developed and are assuming their proper positions beneath those they are

eventually to replace. It will also be observed that the jaws are constantly developing to meet the demands of the increasing number and size of the permanent teeth. The ramus is seen here to have assumed something of its final or adult shape.

Seventh. This picture (Fig. 7) shows the first permanent or sixth-year molar fully developed, except the ends of its roots, the crown of the second permanent molar fully formed, and the crowns of the incisors, cuspids, and bicuspids well developed, with the roots in some

FIG. 6.

instances beginning to form. It will also be noticed that the roots of some of the temporary teeth have commenced the process of absorption. The ramus in this case seems to be less perfectly formed than in the last picture, showing that jaws, at the same age in children, are not all alike.

Eighth. In this picture (Fig. 8), at the age of eight years, we see the four temporary incisors replaced by the four permanent ones in each jaw. The temporary cuspid and first molar in the lower, and the first molar in the upper, are missing,—prematurely, so we would say, as

FIG. 7.

FIG. 8.

FIG. 9.

FIG. 10.

very much depends upon the retention of these teeth (especially the cuspids) until a much later period. If they are removed before the permanent ones are sufficiently developed to have fully expanded the jaws at these points, to admit of their taking their proper positions in the arch without delay, irregularity of the teeth will almost invariably be the result. I do not wish to be understood as stating that contraction of the jaws takes place in consequence of the too early

FIG. 11.

extraction of any one or of a number of the temporary teeth, but that by the pressure produced by the growth of the permanent molars, in the posterior regions of the jaws, the remaining temporary teeth are forced toward the front of the mouth, and the spaces where the teeth have been removed are partially or wholly closed by them. The tendency of the teeth, as a rule,—certainly until adult life,—is toward the front of the mouth or symphysis of the jaws.

It will be seen in this case that the cuspids and bicuspids have advanced in development materially during the past two years, the

cuspid and first bicuspid in the lower jaw having been forced through the alveolar process. I want to call attention especially to the depth at which the cuspids are situated in this instance. The second permanent molars are here quite prominent so far as their crowns (the only portion thus far developed) are concerned.

FIG. 12.

FIG. 13.

FIG. 14.

Ninth. In this picture (Fig. 9), which represents a child's jaws at ten or eleven years of age, we see that the lower temporary cuspids and first molars are still retained in the mouth, while in the upper jaw they have been removed, and their places are occupied by the permanent cuspids and first bicuspids. The roots of the second temporary

FIG. 15.

FIG. 16.

FIG. 17.

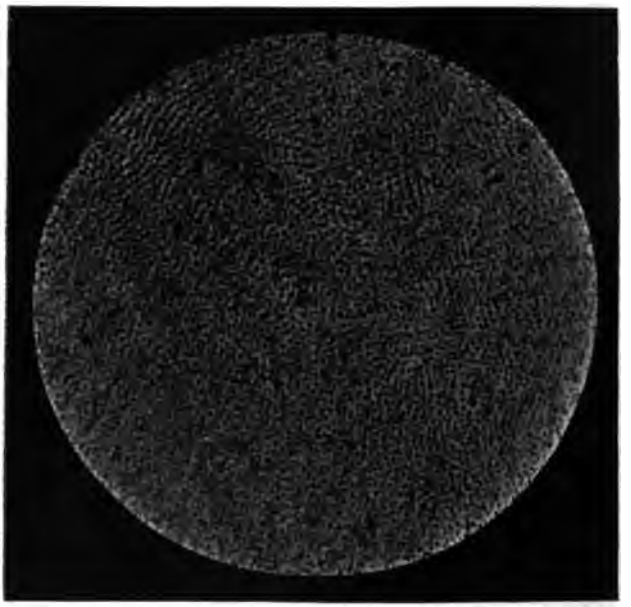
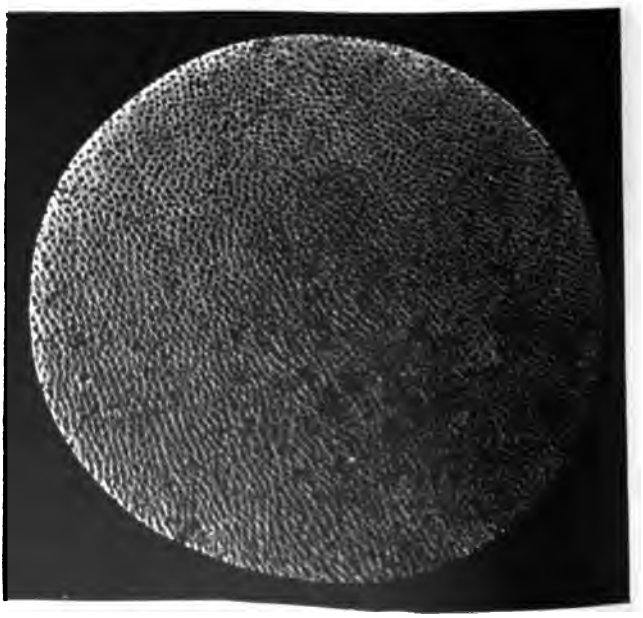


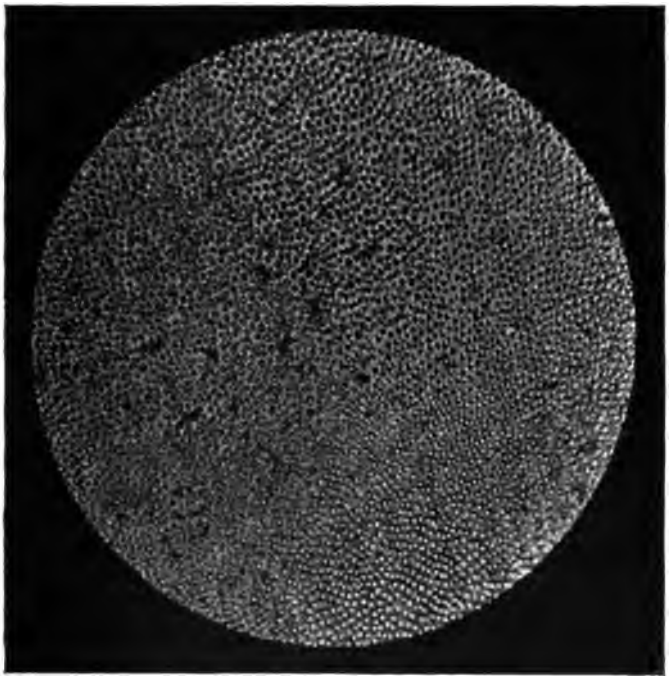
FIG. 18.



molars are nearly all absorbed, with the second bicuspids far advanced in growth, as is also the second permanent molar, while the crown of the third molar is partially developed in each jaw. In passing, I may remark that calcification begins at the cutting-edges of the front, and upon the grinding-surfaces of the back teeth, or at the immediate coronal surfaces of all teeth.

Upon careful examination of this picture, it will be seen that the

FIG. 19.



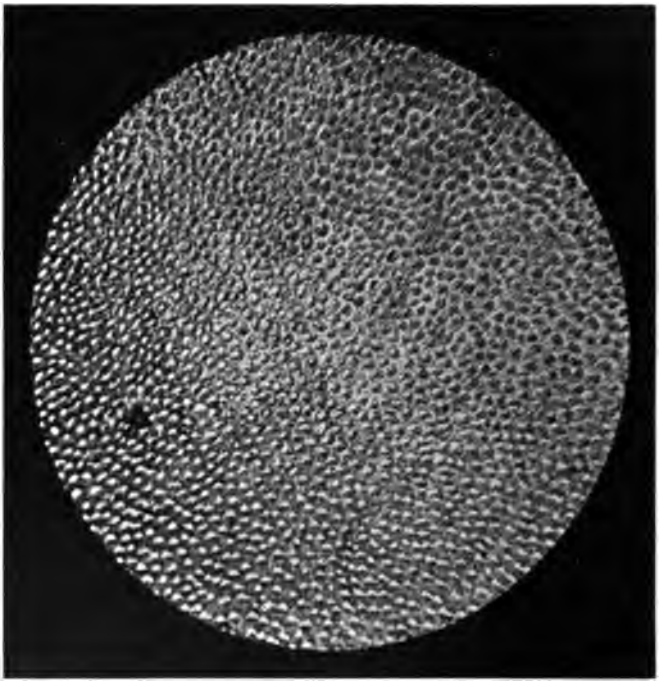
permanent set of teeth has plenty of room to come into the mouth regularly.

Tenth. In this picture (Fig. 10) it will be seen that all the twenty permanent teeth, except the lower second bicuspids, have taken the places of the temporary ones. This is at the age of twelve years. The second permanent molar (twelfth-year molar) is fully developed, but the third molar shows signs of tardiness in its growth; in fact,

that tooth in this case seems to be dwarfed,—not an unusual occurrence.

It will be observed that the development of the ramus in this instance is quite perfect, very nearly the adult size having been attained.

FIG. 20.



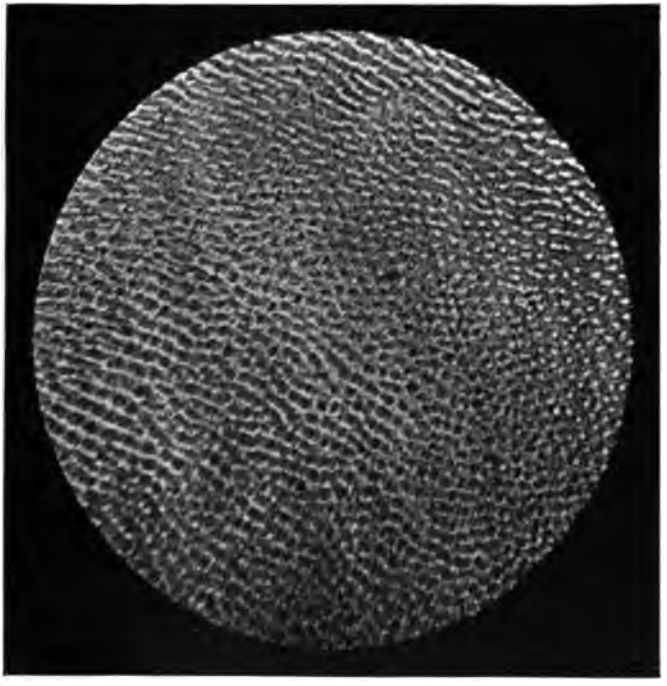
Eleventh. Here we have (Fig. 11) the permanent set of teeth in position in the mouth, except the third molars, which are seen to have developed to the extent of their entire crowns, which are of good size; in fact, rather too large as compared with the second molar, the regulation size being slightly smaller. Here you have an opportunity of seeing the size and importance in the jaws of the first molars, which in itself is a lesson worth the time and trouble of preparing and bringing these illustrations before this learned body.

Twelfth. We here show you (Fig. 12) a full and perfect set of both the temporary and permanent teeth of the upper jaw, standing side by

side, with a line drawn across the second molars of the temporary and the second bicuspids of the permanent set, to show that the ten permanent teeth which occupy the places formerly filled by the ten temporary ones require no more room or space than their predecessors. By careful measurement they prove to be the same.

Thirteenth. In this picture (Fig. 13) we show the temporary set of

FIG. 21.



teeth entire. The relations one to another are plainly seen ; the ends of some of their roots, you may observe, are slightly absorbed.

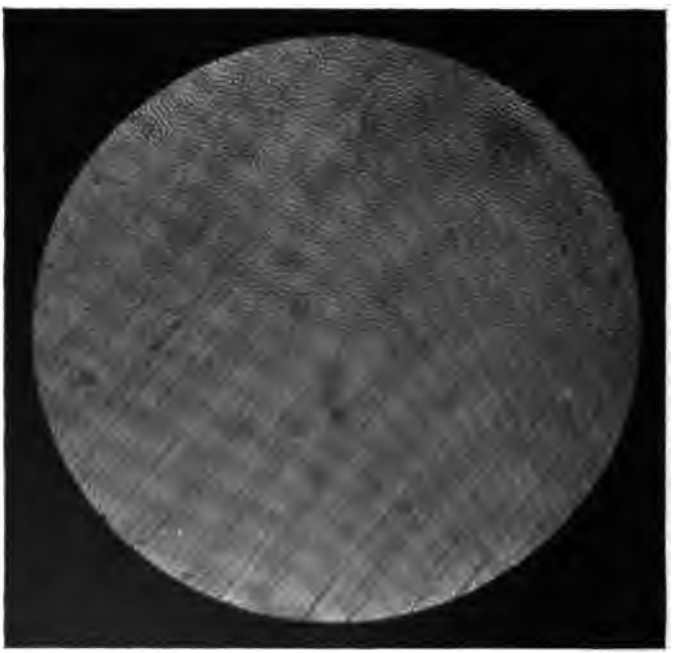
Fourteenth. Here we have (Fig. 14) the full set of permanent teeth intact and in perfection, showing the size and relation of each tooth to the others, the line of occlusion not being observed.

Fifteenth. A case of atrophy (Fig. 15) of both jaws after loss of all the teeth. A study in itself worthy of the attention of any student in histology.

Sixteenth. The three stages of man as shown in the jaws (Fig. 16) : The child at two ; the man in full vigor and development ; and the aged, after the loss of the teeth and atrophy of the alveolar process and maxillary bones,—changes that are almost appalling.

In the following series of illustrations I propose to show the changes that take place in both the dentine and enamel under protracted irritation, without any reference to the source or manner in which the said irritation has been brought about or produced.

FIG. 22.



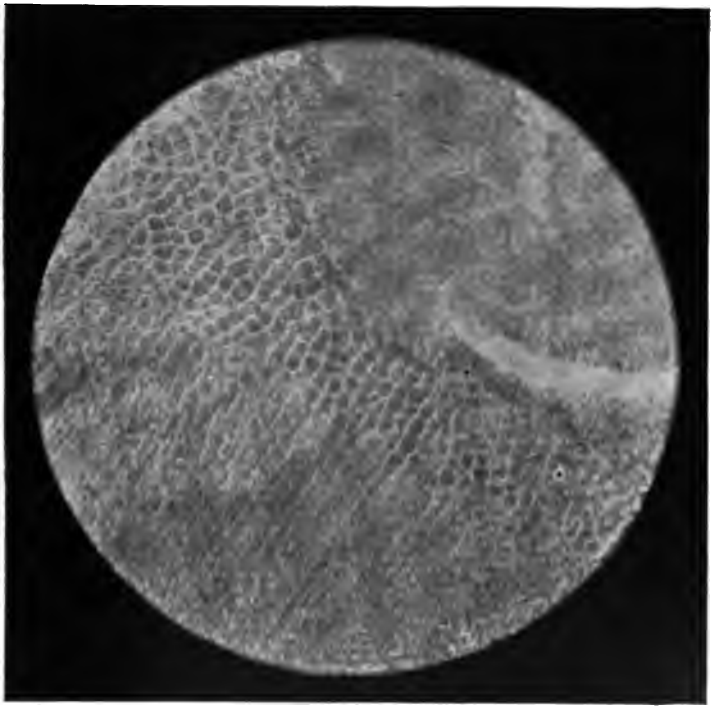
1. Fig. 17 shows a cross, or slightly oblique section of dentine, in which very little irritation, and consequent enlargement of the canaliculi, is to be seen. In some places, however, the openings formerly occupied by the living matter in the canaliculi are plainly visible, surrounded by the nourishing fluid, or the space it occupied in the living tooth.

2. We see here (Fig. 18) another cross-section of dentine in

which a slight increase in the irritation is manifest from the very little enlargement of the canaliculi, which is readily observed. It will also be noticed that the contents of the canaliculi are more clearly observable, the space formerly occupied by the living matter in their centers being more plainly seen, indicating an increase in its diameter.

3. In this picture (Fig. 19) the effects of irritation are plainly visible, the canaliculi being enlarged to two or three times their normal size.

FIG. 23.



It must be borne in mind that by this enlargement of the contents of the canaliculi the basis or intertubular substance is encroached upon or melted down, and the lime-salts of its structure are either held there in solution, or are carried away by the circulating fluid. The latter could hardly be the case, as under irritation, as here represented, the function of the tissue has been materially interfered with. In a few places we see in this specimen that the intertubular substance

has entirely disappeared, two or more canaliculi coalescing. This, as you can readily understand, involves a considerable increase in the amount of organic material at these points, and consequently an increase in the amount of living matter, the product of inflammation.

I may observe in passing that these slides were all taken with the same magnifying power of the microscope, viz, six hundred diameters.

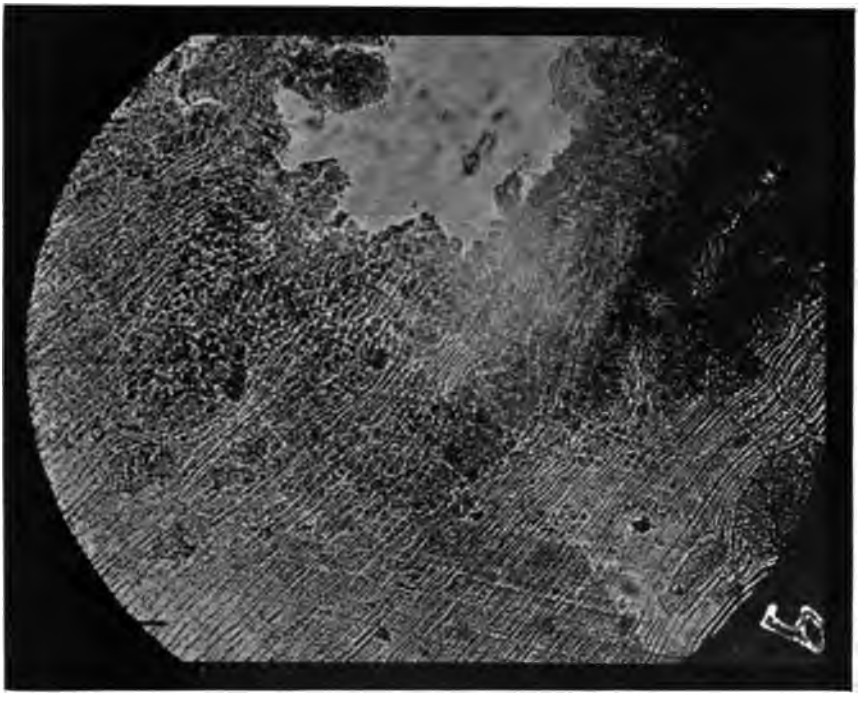
FIG. 24.

Upon one side of this picture it will be seen that the inflammatory condition was much more severe than upon the other, as indicated by the larger size of the canaliculi.

4. This again (Fig. 20) is a cross-section of dentine in a still more highly inflamed condition, showing the intertubular substance very

much diminished and the organic portion very much increased. This increase in the organic portion, in which the living matter of the dentine plays an important part, being the product of inflammation (inflammatory tissue) is most acutely sensitive when touched with an instrument. It is this condition of inflamed dentine which after the tooth has been filled becomes restored to its normal condition by a

FIG. 25.

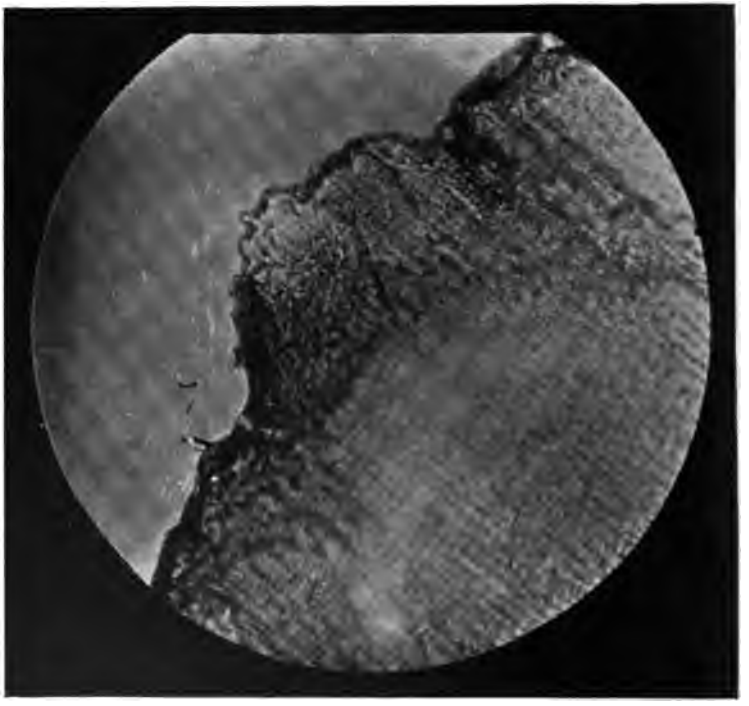


process of recalcification, which takes place as the inflammation subsides, as it does after the cause of the disturbance has been removed and the parts are protected from further irritation.

5. Here we have (Fig. 21) an oblique section of highly inflamed dentine showing the same conditions as are seen in the previous picture, with the additional feature that in many places several of the canaliculi have coalesced, the intertubular substance between them having been entirely broken down. This would indicate that the inflammatory condition was either more acute or of longer standing in this case.

6. In this slide (Fig. 22) I present an extremely interesting picture. Upon the one side is to be seen dentine to all appearances in a normal condition, and upon the other the same tissue quite considerably inflamed, as indicated by the larger size of the canaliculi in cross-section. The lines running from the inflamed portion into the normal are the effect of gradual diminution of the inflammatory condition toward the pulp of the tooth or toward the less affected dentine.

FIG. 26.



7. Here (Fig. 23) I again have a cross-section of dentine, showing upon the one side dentine very slightly irritated and the canaliculi but little enlarged, while upon the other it will be seen that they are enormously enlarged. In many cases the intertubular substance has altogether disappeared, and the canaliculi have coalesced to the number of from two to ten or fifteen. Outside of the territory of enlarged and coalescing canaliculi is to be seen a decalcified mass of dentine filled with organisms.

8. We have in this picture (Fig. 24) a longitudinal section of carious dentine, showing the enlarged canaliculi, with a mass of decalcified dentine filled with organisms upon the surface.

9. In this illustration (Fig. 25), which, by the way, is a most interesting one, is shown a highly inflamed condition of the dentine in longi-

FIG. 27.

tudinal section. It will be observed that large territories are broken down, involving numerous canaliculi in several places in the field covered by the microscope, besides numerous smaller ones. I hardly think it practicable to illustrate the effects of the inflammatory process upon dentine more clearly than is here shown, both in cross and longitudinal sections.

10. I will now call your attention to (Fig. 26) the effects of irritation as present in the carious process upon the enamel. I am aware that it is hard to imagine a tissue so nearly a solid mass of lime-salts as the enamel of a tooth in a condition showing the effects of irritation of its organic portion. It must be borne in mind that this tissue holds in its composition, at the most, not over five per cent. of organic material; notwithstanding this small amount, the inflammatory re-

FIG. 28.

action in caries is seen in this specimen to have been most marked. Upon the one side of the picture the enamel is normal and perfect. As we approach the territory where destruction was taking place, we come upon a disorganized mass, so much so that the little blocklets are seen to have been separated more or less from their neighbors. This is more plainly shown in the next illustration.

11. Here it is seen (Fig. 27) that upon the one side is enamel in its normal condition, longitudinal section, and as we approach the carious

part the effects of the inflammatory process are most clearly perceptible. The organic substance situated between the blocks which constitute the enamel-prisms, and between the prisms themselves, is seen to have increased in bulk to such an extent that it is a decidedly conspicuous feature in the picture. No drawing that I have ever seen of carious enamel illustrates more clearly the presence of living matter (matter subject to irritation) in this tissue than is seen in the picture before you. No organisms can possibly have entered this tissue; consequently we must look to the surface irritation for the conditions here presented.

12. I here present still another illustration (Fig. 28) even more marked in the effects of inflammatory reaction upon the enamel than the last. While we are unable to show here very perfect enamel, we can see most plainly the effects of the increase in bulk of the organic portion of the tissue, the separation of the blocklets in consequence, and its generally disorganized condition.

SECTION IV.—Continued.

A Case of Diffused Non-Suppurative Lymphadenitis of Dental Origin.

VOLUNTARY PAPER BY VIDA A. LATHAM.

THE interest in this case lies in the fact that according to dental literature it is apparently rare, judging by the number of instances recorded. That we might expect the disease to be very common would be most natural on account of the every-day nature of the causes which most frequently give rise to it, viz, septic wounds. But in looking through the bibliography the subject is not to be found under the ordinary titles of Adenitis, Lymphadenitis, Lymphatic Infection, etc. So far I have only found two authors who mention the subject, and those very briefly, viz, Smale and Colyer, and Bödecker. These are the only references found in a somewhat extended search among our works on dental surgery, pathology, and in our journals. Indirectly, however, it may be treated in the articles on Alveolar Abscess, though so far I have not seen it.

Tomes in his "Dental Surgery," page 461, asks the question whether inflammation and consequent alveolar abscess is in all instances of a septic character. This is an open question even to-day, though the majority are, it is to be hoped, in favor of antiseptic treatment, careful filling, and so having a fair prospect of the recovery of the tooth.

We do have parulis after exposure to cold, over-exertion, and mechanical irritation; these are often accessory causes of ordinary gland inflammation acting as local depressants, favoring the activity of infective organisms that otherwise would have been inert.

As is well known, a state of general debility predisposes to glandular inflammation and enlargement. Many also deny the destroying of pulps without caries visible to the eye. That we do have such cases is well known and that the cause is not always easy to find, for no history of injury, lactic acid diathesis, or infectious diseases can be discovered, and it is these teeth that often give rise to infections of the lymphatic glands which are confounded for tuberculosis at first sight. They give no pain or only slight uneasiness, sometimes neuralgia, and a variable swelling in either the submaxillary or parotid region which may continue for some time, when the patient, becoming anxious, consults a physician for treatment, and for some time seems better. Suddenly, however, there appears a large swelling, the loosening and elevation of one tooth, or it may be several teeth, though there may be no swelling of the gum. The patient in some alarm sees the dentist for fear of further trouble.

The following case shows the truth of these statements, and I wish to express my thanks to Dr. Bertha E. Bush for kindly allowing me to use the case and for furnishing notes of the same:

"Mrs. X., æt. forty-two years, previous history all good, consulted me March 9, 1895, concerning a painful swelling above and behind her right ear. She had first felt pain in the region three days before, and had supposed herself suffering from neuralgia and 'a cold' until the appearance of a swelling near the 'crown of her head,' with smaller enlargements extending back of the right ear, together with pain and stiffness of the neck, led her to fear something more serious, and to consult her physician. I found a moderate elevation of temperature, heavily coated tongue, sallow complexion, complete anorexia, and constipation. Examination revealed a boggy, tender enlargement, rather bigger than a walnut, just back of the right parietal eminence; another half as large, about two inches below it, and a third of the size of a pea, just back of the mastoid process. Each of these swellings was distinctly outlined, and movable upon the underlying tissues, though tender on pressure. None of them showed any appearance of 'pointing.' Several small swellings extended in a chain along the posterior border of the sterno-cleido-mastoid to the clavicle. There were also tender swellings in the right axilla and along the inner aspect of the right arm and forearm, especially noticeable at the bend of the elbow. There was muscular rigidity and intense soreness about the right side of the neck, and some stiffness of the jaws, which was drawn toward the right shoulder.

Examinations of the throat and ear were negative. A diagnosis of inflammation of the superficial lymphatic glands was evident, but the infection atrium could not be found in any of the ordinary situations. There was no suppurative otitis, no mastoid disease, no septic wound apparent. The glands of the submaxillary and parotid regions were *not* involved, and there was no swelling or pain about the face.

"As a last resort, and only because no other starting point for the trouble could be found, I referred her to Dr. V. A. Latham for examination of the teeth, the patient meanwhile protesting that 'her teeth were not aching and could not be at fault.'"

When I examined the patient I found her mouth had been well cared for and the teeth in good order, a number having some amalgam fillings which had been carefully done to all appearances. The patient had recently been to a dentist and had a tooth filled. This fact made me somewhat suspicious, and I looked for a dead tooth. The inferior second bicuspid of the right side had a posterior approximal filling of amalgam and on percussion gave a dull sound,—a sense of uneasiness at the apex. It was *very slightly* loosened, but the patient "thought the tooth felt big." A slight thickening seemed present over the buccal surface of the root. After some discussion and persuasion, for the lady felt convinced that the tooth was not the source of trouble, I was allowed to drill out the filling,—no easy matter, on account of the great tenderness and stiffness of the jaws; and as soon as I opened the pulp-chamber the odor of hydrogen sulfid was very pronounced and considerable relief was given the patient, which speedily convinced her. After opening the root under antiseptics and taking care to avoid forcing any more septic matter through the apex, the opening was loosely dressed and I requested my friend, Dr. Bush, to change it when she saw the case, as I was not living in the town, but would see the case later. Anticipating the probability of an abscess forming, the patient was seen daily till March 12, 1895, when a swelling occurred over the right buccal surface of the second lower bicuspid. This was deeply incised to relieve the great congestion, to check distension, and at the same time to liberate the pus about the apical foramina, as the several teeth had become quite loose. True fluctuation was not present, and only a drop or two of pus escaped from the incision. The wound was thoroughly cleansed with antiseptics and packed with gauze to secure drainage, changing it several days.

Then I enlarged the opening in the root with the engine and Gates-Glidden drills, cleansed, and loosely packed with antiseptic cotton. The solution used to penetrate the dentinal tubules was,—

℞—Eucalyptol, 3 parts;
Ol. cassia, 2 parts;
Ol. eugenol, 1 part;

and this was closed in with a temporary stopping, being renewed daily for several days, the rubber-dam being always applied. The soreness and swelling reduced, I now packed the tooth tightly with dermatol in eucalyptol (Sanders), sandarac cotton, then Jacob's stopping, and left for two weeks. The tooth seemingly was well. The root was then carefully cleansed, filled with eucalyptol-percha and cement, the intention being to fill later with gold if the tooth gave no further trouble, which now at the end of five months seems unlikely.

The lymphatic glands and their drainage-area may be seen outlined in the following table :*

TABLE SHOWING THE DISTRIBUTION OF LYMPHATIC GLANDS AND THEIR DRAINAGE AREAS.

HEAD AND NECK.

Glands.		*Distribution Area.*
I. Sub-occipital II. Mastoid	drain	Posterior half of head.
III. Parotid	"	Anterior half of head, orbits, nose, upper jaw, upper part of pharynx.
IV. Submaxillary	"	Lower gums, lower part of face, front of mouth and tongue.
V. Supra-hyoid	"	Lower anterior part of tongue, chin, lower lip.
VI. Superficial Cervical (lying beneath Platysma)	drain	Anterior part of external ear, side of head, neck and face.

*Compiled mainly from :

Curnow and *Treves*.

Curnow. Lancet, 1879 (London).

Sappey. Anatomie et Physiol. Path. des Vaisseaux lymphatiques. Paris, 1874.

Morris. Anatomy.

Gray. Anatomy.

Glands.	*Distribution Area.*
VII. Retro-pharyngeal drain	Nasal fossæ, pharynx (upper part).
VIII. Deep Cervical (Upper Set) (along carotid sheath) drain	Mouth, tonsils, palate, lower part of pharynx, larynx, posterior part of tongue, nasal fossæ, parotid and submaxillary glands, interior of skull, deep parts of head and neck.
IX. Deep Cervical (Lower Set) (In supra-clavicular fossæ) drain	Upper set of lymphatic glands, lower part of neck, and join axillary and mediastinal glands.
UPPER EXTREMITY.	
I. Supra-condyloid	Three inner fingers. Occasionally there are glands in bend of elbow.
II. Axillary	Upper extremity, dorsal and scapular regions, front and sides of trunk and breast.

ETIOLOGY.—Inflammation and enlargement of lymphatic glands is most common in the submaxillary region and the neck, as they are most exposed to irritation, which is nearly always due to a transmission of infectious material through the lymph-vessels into the lymph-glands.

Eczema capitis, pediculi, give rise to occipital and upper cervical gland enlargement; herpes about the nose to parotid and submental glands.

Carious teeth, ulcerated gums, to the submaxillary.

Upper set of cervical glands enlarge from irritation of the meatus externus in otorrhea and tonsillitis.

There is a lymphatic gland over the tonsil which is usually enlarged in affections of that structure and not perceptible from the neck in ordinary conditions.

Purulent pulpitis, pericementitis, and gangrene of the pulp often cause this trouble. Especially is this true of the lower mandible. In the upper they rarely affect the lymph-glands of the submaxillary region.

Those glands which drain areas rich in lymphoid tissue are the ones most often enlarged, as the cervical, bronchial, and mesenteric. From statistics lymphadenitis appears to be more common in persons under ten years of age than at any other period, though in adults we find it with the third dentition, or after extraction of the third molar teeth, or after attempts at root extraction. As is well known,

lymphatic tissue is most commonly the seat of tuberculosis and lymphadenitis, the latter being more common than lymphangitis, since any solid material taken into the lymphatic vessels is apt to be arrested in the adjacent gland. Irritating material passing up the lymph-stream is not by any means always arrested at the nearest gland, partly because the material may sometimes pass through one gland and involve the next, or after one gland has become inflamed it may become the source of infection to the next in the chain, and so on. Hence, search should be made for sources of *irritation out* of the usual path, if none are found in the common positions. Always, therefore, examine the whole area draining to that gland for the source of irritation, past or present.

SIGNS AND SYMPTOMS.—*Simple acute adenitis* is recognized usually by having no fistulous openings present in the gum, short history, pain, and great tenderness of the part, as well as by presence of acute source of irritation, as alveolar abscess, acute tonsillitis, and by the fact that usually only one gland is enlarged, though several may be tender.

PROGNOSIS.—Depends upon the constitution of the patient and the promptness and efficiency of the treatment.

SEQUELÆ.—Abscess, simple or multiple; septicemia and pyemia.

DIFFERENTIAL DIAGNOSIS.—Must be made from tubercular adenitis, anthrax, lymphadenoma, lymphoma, metastatic growths in sarcoma, carcinoma, and odontoma.

The following summary shows the most noteworthy features of the case,—viz, First, the age of the patient; Second, the apparent absence of an ordinary cause; Third, the extent and location of the adenitis; Fourth, the prompt subsidence of the trouble on the removal of the cause; Fifth, the absence of glandular enlargement in the nearest lymphatic groups—viz, the submaxillary or parotid glands; Sixth, the absence of the cardinal symptoms of pericementitis and alveolar abscess except tenderness on percussion.

SECTION V.

MATERIA MEDICA AND THERAPEUTICS.

REPORT BY J. S. CASSIDY, CHAIRMAN OF THE SECTION.

THE extraordinary efforts made by manufacturers of newly discovered medicinal compounds to introduce their goods into the recognized circle of therapeutics, have had much to do in the development of extra confidence in the potency of drugs, and of the unusual enthusiasm accompanying the work of systematic clinical investigation during recent years. The increased energy displayed on these lines of experiment with a view to evolving remedies against disease and its consequences is more largely due, however, to the general acceptance of bactericidal dicta, which among others declare that a given morbid condition of tissue has an exact organized individual extraneous physical cause, and which probably may be overcome by some as yet undiscovered antagonist.

The radical craving of all animated nature is for life and health in all the parts, and the power to enjoy; and therefore the discovery and the application of the means by which these conditions are to be maintained must continue to be the highest aim of human effort. Although it is too much to expect that there will be general immunity from disease, in either the near or distant future, or even a cure under all circumstances by the very best methods of treatment, the probabilities are, judging by what has already been accomplished during the present period of bacterial influence, that substances at least near akin to the beau ideals of which we dream will ere long take their appropriate places; each in its own sphere of special usefulness.

Meantime we must do the best we can with those things we

already have, and of these iodoform, the much abused, holds a unique position. It is noticed that whenever anything is really distinguished for superiority in a certain direction, there will be some objection made to it. Forthwith a substitute is sought for, which must possess all the good and none of the bad qualities of the prototype, and too often we are "on with the new love before we are off with the old."

One of the queer things appearing with the demand for iodoform substitutes, is that they must all be more or less rich in iodin. Aristol, for instance, is thymol iodid ($C_{10}H_{13}IO$), iodoform being menthenyl iodid (CHI_3). It does not follow, however, that these must give up their iodin in order to be therapeutically active. Indeed, but comparatively few chemical compounds are dependent on decomposition for their medicinal activity, among such being the peroxids of hydrogen and of sodium, the hypochlorites, etc.

The disinfectants as a rule either give to or take from the infectious matter their individual equivalent radicals, negative or positive, as the case may be. Antiseptics, on the contrary, do not as a class lose their chemical identity by contact with organized material; of such are iodoform, common salt, carbolic acid, etc. They act as antiseptics in their capacity of compounds, as is easily proven by sufficient experiments, notwithstanding some authorities claim that iodoform, at least, is effective only by setting its iodin free. We could claim on the same principle as well that its near relative, methenyl chlorid ($CHCl_3$) chloroform, must give up chlorin in order to produce its well-known physiological effects, or that because some red-haired man, in the long ago, swam the Hellespont, all those who are blessed with the same colored appendage are the only species of the genus homo who are good swimmers.

Many of the most dangerously active bodies in their influence on animal life, retain their compound nature when in action, of which prussic acid (HCN) and arsenious oxid (As_2O_3) will serve as examples. We need not, therefore, necessarily pay attention to the relative proportion of any element in a compound, so far as the medicinal effects are concerned, unless the mode of action of the compound involved is by coincident decomposition in the presence of organized structure, and of such iodoform and its congeners are not good examples.

One of the newest drugs belonging to this latter category is called diiodoform (C_2I_4), although it bears no chemical relation to its well-

known prototype, unless it be regarded as a derivative—which it is not—of two molecules of the latter, plus two molecules of hydriodic acid ($2CHI_3 = C_2I_4 + 2HI$). It is obtained by adding equivalent of I to solution of acetylene dehydrogen iodid (C_2I_2) in CS_2 and evaporating. Being analogous to ethylene (C_2H_4) it might properly be named ethylene dehydrogen iodid, or better still, according to actual composition, dicarbontetraiodid. It forms brownish-yellow crystals, tasteless, almost odorless, insoluble in water and alcohol, freely soluble in chloroform, carbon disulfid, benzene, and other hydrocarbons homologous with the latter; melts at 378° F., and decomposes into free C and I at a temperature of 392° F.

An impalpable powder obtained by pulverizing the crystals assumes a nutmeg color, emits a slightly enervating odor, but not unpleasant in its effects nor hypnotic like iodoform. When presented in powder to freshly cut or abraded surfaces, or in chloroform solution into root-canals, it fulfills the duties of a very good antiseptic; when either the crystal or powder is inserted dry into root-canals and fused by a hot broach, it resolves on cooling into an insoluble black concrete mass of permanent character. This condition obtains also when fused in the ordinary way; it is therefore not susceptible to perfect sublimation. Its germicidal and disinfectant powers are weak. Were it not, however, that so many of us are fond of iodoform we would probably regard this dicarbontetraiodid as an excellent, almost indispensable antiseptic.

Electrozone, produced by partial electrolysis of sea-water, although not generally introduced, has proven to be an acceptable, inexpensive, and effective germicide and disinfectant. The chief active principle of the preparation is sodium hypochlorite (NaClO), but containing also other hypochlorites and analogous salts of iodin and bromin.

Hypo-salts, especially those of the haloid elements, possess strong reducing properties, being able, for instance, to remove hydrogen from bacterial substances, a fact which largely explains their medicinal effects.

Twenty-five per cent. dilution of electrozone does good service as an injection into the antrum immediately after the withdrawal of pus. I think it is preferable for this purpose to peroxid of hydrogen, inasmuch as it is not accompanied by a too rapid evolution of gas and consequent painful pressure in the cavity.

Many experiments made during the past year in the laboratory, and on the living subject as well, with aqueous solutions of the gas

formaldehyd have convinced the writer that as an embalmer of pulp débris it is superior to all other agents thus far employed exclusively for such purpose. The aldehyd (CH_2O) condenses into paraldehyd ($C_3H_6O_3$) in the meshes of the devitalized tissue, and at the same time absorbs the organic laden moisture present, changing the débris into a hard coherent non-infectious residue.

In closing this report, I wish to thus publicly thank my predecessor, Dr. Harlan, for having called our attention to the virtues of trichloracetic acid ($C_2HCl_3O_2$). When properly diluted and applied to the inflamed parts including and surrounding the peridental membrane, due to whatever cause, its magical influence, owing to its solvent, caustic, stimulant, and astringent action combined, in lessening if not curing the disease, is so evident,—and which favorably suggests its use in other directions also,—that a specific position in this hitherto rather barren field of therapeutics has been justly awarded it by those who have given it a fair and impartial trial.

DISCUSSION.

DR. HOFF: I wish to refer to one of the remedies that Dr. Cassidy mentioned in his report, which is formaldehyd, or formol. It is, as many of you know, a very powerful germicide, and as Dr. Cassidy recommends, it is one of the best agents for treating foul root-canals that I know of, as a desiccating and disinfecting agent. I have been experimenting with it a little as an agent for obtunding sensitive dentine, and have found that it has a certain amount of beneficial effect. It is a bibulous drug, has a strong affinity for water, and on that account its use was suggested to me as a desiccating obtundent of sensitive dentine. I found, however, that if applications of it to dentine be allowed to remain for any length of time it produced considerable irritation, and if there was a near approach to the pulp excessive irritation followed its use. But I found that by diluting the formol it was less irritating. By diluting with chloroform in the proportion of twenty per cent. of formol to eighty per cent. of chloroform, and then adding to this cocain in various proportions, the irritable tendency was overcome, and an obtundent result obtained. I have experimented with several proportions of cocain, beginning with five per cent., and using as high as twenty per cent. I do not know that I have obtained any particular modification from the various per cents. of cocain; the chloroform by diluting the formol makes it less irritant, and at the same time does not reduce its bibu-

lous power, and a better carrier for the cocain is obtained. It can remain in a cavity longer, and will obtund without irritating excessively. Where it is used in this way great care, of course, must be exercised. It should not be left in the cavity for any length of time. Simply wipe out the cavity with the solution, and then dry it out with the hot-air syringe. I have succeeded in obtunding dentine in this way very satisfactorily and quickly. I have not experimented with it long enough to have any very definite data concerning it, but the principal thing for which I used it was its facility in taking up water, and then to desiccate the dentine.

DR. GILBERT: I wish to throw out a word of caution in regard to the use of formalin. I have experimented with it and find it to be dangerous to the pulp. I have removed partially devitalized pulps with it, bringing them away in a leathery condition.

While I am speaking, I would like to say that in place of iodoform I have for some time been using a preparation called loretin. It is odorless, and may be used in any place where iodoform is indicated. I am having good results from its use in the treatment of abscessed and pulpless teeth. It seems to act more promptly than iodoform, and does away with the odor. On all ulcerated surfaces it acts nicely. The sole agents for this preparation in the United States are Schulze, Berge & Koechl, New York.

DR. JACK: In respect of formalin I would say that when it is used for disinfecting the interior of the cavity, or the exposed surface of a pulp, it should not be used in stronger solution than five per cent.

DR. FILLEBROWN: And one per cent. is sufficient.

SECTION V.—Continued.

A Suggestion about Cocain.

PAPER BY GEORGE EDWIN HUNT, SECRETARY OF THE SECTION.

THE advent of every new drug into the dental materia medica is followed by a period of experimental therapeutics. It is tried in various doses and under varying conditions until its worth or worthlessness is proven. In the case of many medicaments, and especially those for local application, a variation of a grain or so in the dose is unimportant, and after settling the medicinal value of the article under the conditions existing in the oral cavity, dentistry has either encroached a trifle more upon the sacred right of the physician to prescribe and use disease-destroyers, or another drug has gone thundering down the corridors of time to fall with a dull thud into the Dead Sea of dental oblivion.

But there are component parts of our drug cabinets in which the addition of a grain or even a fraction thereof to the officinal dose might be accompanied by serious consequences. One of these is cocain.

The abuse of cocain was so marked during the first few months of its use that the only wonder is that any patients are alive to tell the tale. During those days of death and disaster, a fellow-practitioner in my native State announced to me his determination to cease the use of the drug on account of the continual ill effects he met with. In his own expressive language, "Why, Doc., they just keel right over and roll their eyes and kick, and 'i jinks! I've had 'nough."

On inquiry I ascertained that the gentleman had been using a vague amount, designated as "three or four syringefuls," of an indefinite solution specified as a "four or five per cent." And yet we wonder at the prevalence of crime!

While this condition of intellectual stagnation has been largely modified by the efforts of the scientists in therapeutics, it has not been dissipated entirely, and in some localities has only been slightly ameliorated.

A survey of the situation leads me to think that the per cent. solution is largely responsible for the various ill effects observed. The great

majority of dentists, I believe, get their two, three, or four per cent. solutions put up by a druggist, and their ideas of how many grains of cocain are required to make a four per cent. solution are very hazy.

And even if they do know their solution table to that extent, the chances are that they will have to count on their fingers or use a lightning calculator to ascertain the quantity of the drug in any given number of drops. The great majority of inquiries regarding dosage will be met with answers detailing the number of drops and the per cent. solution used. Herein lies the evil,—ignorance of the amount of the drug exhibited.

The maximum dose of cocain should be one-half a grain. To be sure, in the use of the per cent. solutions that amount is seldom exceeded, but that is the *maximum* dose, and the maximum dose of any drug is seldom administered. In the majority of cases an eighth or a quarter of a grain will accomplish the desired result, while the maximum dose would be attended with at least temporary ill effects.

In view of these facts, I would suggest that the per cent. solution be entirely ignored in using cocain *per se*, and that the intended dose be dissolved in an indefinite, convenient quantity of water and the entire amount exhibited. The quantity of water or, for it amounts to the same thing, the per cent. of the solution is immaterial within reasonable limits. An eighth of a grain of cocain in ten minims or ten barrels of water is still an eighth of a grain of cocain; and while introducing the latter quantity would perhaps consume an unreasonable amount of time, to say nothing of the deleterious effects of the water upon some of our patients of the masculine persuasion, the principle remains true.

Following this plan of procedure will impress *dosage* on the operator in a manner that no other method can succeed in doing. Another and a potent argument in favor of this mode is the fact that every solution used is a fresh one.

The rapid deterioration of cocain solutions renders the degree of effects produced from twenty-four or forty-eight hour old solutions extremely problematical. By dissolving the cocain as it is needed,—and only a short time is necessary to accomplish this,—the full effects of the drug are assured. In order to use cocain in this way, it becomes necessary for the practitioner to have a pair of balances on or about his cabinet for the accurate measurement of the drug. These balances will, however, be found useful in various ways, and should be a part of the equipment of every well-conducted dental office, whether cocain is used or not.

SECTION VI.

PHYSIOLOGY AND ETIOLOGY.

REPORT BY J. D. PATTERSON, CHAIRMAN OF THE SECTION.

IN canvassing the dental literature which has appeared in journals, books, and monographs upon the subjects of this Section since the last report in 1894, your Chairman does not find that many notable new theories or original investigations have been added to the sum total of our knowledge in regard to the causes underlying diseases of the oral cavity.

The time and attention of this Association in late years have been directed by the report of the Chairman especially to new theorizing or investigation regarding dental caries, and to diseases of the investing membranes of the teeth. Upon these points new matter has not to our knowledge appeared during the past year, but it is hoped that valuable suggestions upon these and other subjects pertaining to this Section will be brought out in discussion.

While your Section regrets that your attention is not called to special new points, it is impelled to say that the interest in the physiology and etiology of diseased conditions is steadily increasing. The profession, we believe, by this inquiry and interest is just a step in advance of the position held one year ago, and this report gladly notes the better professional spirit which must ever be the outcome of the study of physiology and etiology.

In the line of the work of this Section there has appeared during the past year the beginning of a series of articles by Dr. G. V. Black, of Jacksonville, Ill., upon "An Investigation of the Physical Characters of the Human Teeth in Relation to Their Diseases;" and the first of these articles, published in the *Dental Cosmos*, especially

comes under the head of Physiology. The following are some of the conclusions arrived at through original investigations by the author:

"I think the thought of the profession derived from clinical observation has been that the teeth of individuals presented strong personal characteristics as to density, and the relative amount of lime-salts and organic matter they contained; or in other words, the thought has been that some persons had teeth that were much denser than those of others, and that the basis of this difference was the relative amount of lime-salts and organic matter. A study of the results shows that there is a difference, but it is so slight as to be almost nil.

"We find also strength or ability to withstand heavy pressure without fracture or crushing is also not directly dependent on its percentage of lime-salts. *The only logical conclusion is that no diminution of the density or of the percentage of lime-salts occurs in the teeth of women during the period of child-bearing on account of that fact.* The broad claim that women's teeth become soft during the period of child-bearing has been based upon the clinical observation that their teeth suffer more from caries during that period, and seems to be purely a hypothesis based on that other hypothesis that soft teeth decay more readily than hard teeth. We must find some other explanation of this clinical fact.

"*These classifications, therefore, show conclusively that neither the density of the teeth nor the percentage of lime-salts they contain has anything to do with the liability of the teeth to suffer from caries.* In other words, *the teeth of persons who suffer much from caries are just as hard, just as dense, just as heavy, and contain just as much lime-salts as the teeth of persons who do not suffer from caries.*"

The investigations of recent years have been somewhat suggestive in regard to the antiseptic quality of the blood. Dr. Black says,—

"It has been a long time now since the theory that immunity from micro-organisms might be due to the presence of a deterrent substance in the blood entered the minds of scientific men, this substance being something that would prevent the growth of the invading bacteria, or prevent the development of their toxic poison, but it has been an exceedingly difficult matter to secure evidence upon this point."

The conclusions of Dr. Black are that the apparent immunity from caries of the teeth which is observed may be through some power or influence acting through the medium of the oral fluids to produce these differences which are forced upon our notice.

In a paper upon this subject read before the Kansas State Dental Association at its last meeting, by E. Bergstresser, D.D.S., the complete history of investigations upon this point by European scientists, and by Professor Vaughn, of Michigan University, was given,

and the author makes practical application of these discoveries in the treatment of dental disease. He concludes as follows:

"In the treatment of many diseases that come under his care the dentist has frequently overlooked the fact that Nature has a most efficient germicide, soluble and everywhere present in the blood-serum. The appalling list of escharotics and other powerful medicaments that are used in the treatment of pyorrhea alveolaris under these circumstances appears often unnecessary after thorough surgical removal of the exciting cause. It is utterly impossible for the oral surgeon to perform a perfectly aseptic operation from the very nature of the local environment. Yet no other class of surgical cases heal so kindly. The blood-supply of the face and head is so abundant that Nature seems to be able with her own germicidal agent, nuclein, to do far more than the best aseptic surgery can accomplish in any other part of the body. This should be a strong hint to all of us. If more dependence were put on cleanliness and thorough surgery, and less on powerful and irritating germicides, Nature, through her own superior means, would show us results that are now seldom attained."

You will readily recognize the importance of these investigations upon oral pathological conditions.

The Section has received a paper upon a practical case from Dr. Sweeny, of Washington, D. C., and recommends its reading.

SECTION VI.—Continued.

Report of a Case in Practice.

PAPER BY A. W. SWEENY, OF THE SECTION.

ABOUT December 1, 1894, Mr. H., a gentleman in middle life, presented the following case for treatment:

Near the junction of the lip with the gum over the root of the left inferior central incisor there was an irregular, nearly circular opening through the gum and alveolar process, exposing the apex of the root. The opening was about an eighth of an inch in diameter, laterally, and at its upper border there was an extension or fissure nearly as wide as the edge of a ten-cent piece, which extended upward toward the gum-margin, leaving a narrow strip of gum intact just at its free border. Opposite the apex of the root the opening was from an eighth to three-sixteenths of an inch deep. Around its margin, save where the vertical fissure connected, there was some congestion, caused by a few loose pieces of process, but there was no discharge of pus, and the application of pyrozone failed to produce frothing. The nerve connection was severed, and there were several small, dark specks of calcareous deposit about the apex of the root, but the strip exposed by the narrow vertical fissure was perfectly clean, and there were no deposits whatever about the neck of the tooth.

The patient, a gentleman of the highest intelligence, who takes excellent care of his teeth, assured me that there had been no soreness or swelling to call attention to that locality, and, as he shaves daily, it is most unlikely that anything of that nature could have escaped notice. He simply discovered the opening a few weeks before, while away from home, on looking at his teeth. In the spring previous I made a most careful examination of his teeth and found the gums in a remarkably healthy condition, the lower incisors sound

and firm, not a sign of a "pocket" to be seen, and the general state of affairs about the mouth excellent.

The first step in the treatment consisted in the removal of the loose pieces of process from about the apex of the root. Subsequently the tooth was entered from the lingual side, the remnants of the pulp removed, and the canal disinfected and filled, after which the denuded portion of the end of the root was amputated with a sharp fissure bur, the edges of the cut surface rounded off, and the cavity in the process pretty well cut out with a large, round bur.

Owing to the location, it was difficult to prevent particles of food from getting into the cavity; and as the gum-tissue was very thin, the prospect of being able to close it by means of a small plastic surgical operation did not seem encouraging. After some consultation, which proved barren of useful suggestions, I consulted Dr. Gordon White, of Nashville, by mail, about sponge-grafting, and received a very kind letter from him, giving the desired information and alluding to a case then under observation, in which he had had a most favorable result in the treatment of a *superior* incisor. While I considered the prospect by no means good, owing to unfavorable location and the shallowness of the tissue involved, I tried the sponge-graft; and it failed, very promptly.

I then provided the patient with a drop-tube and a prescription of alumnol, water, and Ceylon cinnamon, as recommended by Dr. A. W. Harlan some time since, and directed him to apply it each day, and after each meal to be very careful to thoroughly cleanse out every particle of food. This he did, faithfully and most intelligently, calling in about once a week to have me note results. Improvement was slow, but steady, the opening gradually filling by granulation. It was my intention, when I found the opening below where the root was amputated well filled, to close the fissure (which, by the way, went completely to the gum border just after the first visit) by making parallel incisions in the gum on each side, to gain loose tissue, and drawing it together with fine silk-worm gut; but toward the close of the winter, the patient, who is in public life, was very closely occupied, so that I saw him less frequently until after the adjournment of Congress, when he called once or twice, and I found the opening nearly filled, while the fissure was somewhat narrower, owing to a slight thickening of the gum along its margins.

At this time, however, the patient's general health was not so good; he was rather pale, digestion was impaired, and he complained

of rheumatic pains. Shortly I missed him for several days, when inquiry disclosed that he was confined to the house. He rapidly became worse, suffering intensely from rheumatism of the subacute type, complicated with grave cardiac symptoms and some evidences of meningitis. For days his life literally "trembled in the balance," but unremitting care, aided by wonderful vitality, finally carried him over the crisis, so that at present, some ten weeks after the attack developed, he is greatly improved, and though still weak, is preparing to leave the city.

After the critical stage of his illness was over, I was called in to see the tooth, which, of course, could not receive any attention whatever during the period of greatest danger, and I was much pleased to find everything in a very fairly favorable condition; for, upon removing the accumulations in the fissure, the cavity was found to be nearly closed. The trained nurse in attendance undertook the duty of keeping it free from particles of food, which the patient could not yet do for himself. At this juncture I determined to test a, to me, new preparation called thioform, which had been sent me by Messrs. Otto Hann & Bro., of New York. It is in the form of a very fine powder which is tasteless, nearly odorless, non-toxic, styptic, and antiseptic. It is a combination of bismuth and dithiosalicylic acid, which latter is composed of sulfur and salicylic acid. It seemed especially to commend itself in the treatment of this case, because, in addition to the lack of various objectionable qualities, it was claimed that while insoluble in water, etc., the blood and serous fluids would dissolve out a portion of the acid, leaving a residue as a protective covering. This claim was well sustained, and under this treatment further improvement was shown, so that at the present time the opening at the end of the root has filled up entirely and the fissure only remains through the gum over the front of the root, and that is contracting.

Owing to the loss of bone about the apex of the root the gum is somewhat flattened at that point, so that there is a very slight projection of the end of the root, which, if pared down a little, would allow the gum to grow up better, but the patient is still too weak to admit of any such proceeding at present.

Now, what shall we call the case?

If the loss of tissue resulted from an abscess, caused by the death of the pulp, then the pulp died in a sound tooth, and the abscess formed and broke in a conspicuous place in the mouth of a highly

cultivated, observant, particular man, without attracting any attention until after both process and gum had been perforated. In addition, when first seen, the case did not present the usual appearance of such cases by any means.

May we not rather diagnose it as a case such as Professor Peirce has called attention to, where the calcareous deposit first formed on the apex of the root, independently of any break in the gum-margin, or encroachment of tartar from the neck of the tooth, and that the loss of tissue commenced from within and slowly and painlessly extended outward?

From personal observation I am convinced that the latter is the correct view of the case, and the severe and long-continued rheumatic attack following the manifestation of the local lesion is both interesting and suggestive. The personal history of the patient also furnishes evidence calculated to support the view herein expressed, for, while never a sufferer from true gout, he had heretofore several times experienced serious attacks of rheumatism similar to the one from which he is now recovering.

SECTION VII.

ANATOMY, PATHOLOGY, AND SURGERY.

REPORT BY TRUMAN W. BROPHY, CHAIRMAN OF THE SECTION.

THE Chairman of Section VII would state that during the past twelve months seventy-two papers have been printed on subjects pertaining to anatomy, pathology, and surgery of the oral cavity. It seems unnecessary to read the titles of those papers, with the names of the journals in which they were printed. It will be sufficient to pass them to the Publication Committee and have them appear in the printed Transactions.* It seems to us that this is the best possible report to make in this particular branch of the work of the Association, inasmuch as it enables any one who desires to look up a subject to find it with very little difficulty. In addition to the very instructive lantern exhibit given by Dr. Cryer last evening, we have other papers to be presented. We have a paper by Dr. Ambler, and the Chairman of the Section also has a short paper.

[*The list of papers above referred to seems never to have reached the Publication Committee; and as the Chairman of the Section cannot reproduce it, it cannot be published.—CHAIRMAN OF PUBLICATION COMMITTEE.]

SECTION VII.—Continued.

Studies of the Maxillary Bones.

PAPER BY M. H. CRYER, OF THE SECTION.

MR. PRESIDENT, LADIES AND GENTLEMEN: I invite your attention to some special studies of the maxillary bones with which I have recently occupied myself. There need be little said of the external surfaces and general shapes of these bones, as they are well described in the leading text-books on anatomy.

The internal structures and their relations to other tissues will be studied from sections made through the jaws in various directions. The main points desired to be brought out are as follows:

First. The relations of the mouth and teeth to the maxillary sinus from fetal life to old age.

Second. The shape and size of the sinus at various stages of development.

Third. The relations of nerves and vessels passing through and along its walls.

Fourth. The opening of the sinus into the nasal chamber.

Fifth. The lateral surfaces of the nasal cavities, showing the complex structures that are associated with the nasal portion of the superior maxilla.

In the lower jaw the studies will consist of,—

First. The U-shaped character of the cortical portion and the cancellated tissue within.

Second. The inferior dental canal, or the "cribriform tube of the inferior maxilla."

Third. The relation of the roots of the teeth to the canal and the surrounding tissue.

Fourth. The manner in which the nerves and vessels reach the teeth.

Fifth. Teeth in their normal and abnormal positions in either jaw.

Sixth. Change of cancellated tissue caused by inflammation.

Many of these slides contain several individual studies, and exhaustive discussion on any one will be impracticable. I shall therefore merely refer back to those slides, previously shown, when necessary.

I wish to acknowledge my obligation to Drs. Litch, Darby, Stellwagen, Gleason, and Harrower, for furnishing material from which I made most of the specimens that will be here shown.*

* Following is a glossary of the lettering of the illustrations:

1st M., First Molar.
A A, Apical Abscess.
A D C, Anterior Dental Canal.
A E C, Anterior Ethmoid Cells.
A F, Anterior Fossa of Brain-case.
A P, Alveolar Process.
A r 1st M., Anterior Root of First Molar.
C G, Crista Galli.
C L, Crystalline Lenses.
D G, Dental Germs.
Dis r 1st M., Distal Root First Molar.
E T, Eustachian Tube.
F M S, Floor of Maxillary Sinus.
F O, Floor of the Orbit.
F S, Frontal Sinus.
G P D N, Grooves Posterior Dental Nerve.
H P, Hard Palate.
H S, Hiatus Semilunaris.
I, Infundibulum.
I D N, Inferior Dental Nerve.
I F, Infraorbital Foramen.
I F S, Infraorbital Sinus.
I M, Inferior Meatus.
I O C, Infraorbital Canal.
I T, Inferior Turbinated Bone.
L F S, Left Frontal Sinus.
L I, Lateral Incisor.
M B, Malar Bone.
M E C, Middle Ethmoidal Cells.
M F, Muscles of Face.
M M, Middle Meatus.
M S, Maxillary Sinus.
M T, Middle Turbinated Bone.
N C, Nasal Cavity.
N D, Nasal Duct.
N S, Nasal Septum.
O, Orbit.
O M, Opening into Malar Bone.
O M S, Opening Maxillary Sinus.
P E C, Posterior Ethmoidal Cells.
P I C, Piece of Paper passing through Infraorbital Canal.
P N D, Probe in Nasal Duct.
P P F S, Probe passing Frontal Sinus.
P P I M M, Probe passing into Middle Meatus.
R 1st Bi, Root of First Bicuspid.
R 2d Bi, Root of Second Bicuspid.
R 1st M, Root of First Molar.
R 2d M, Roots of Second Molar.

Slide No. 1 represents the antero-lateral view of the skull, giving a general idea of the various external bones of one side of the face and head. The articulation of the teeth is almost normal. It gives the relations of the bone of which we are to speak, to the other external ones. The outer surface of the lateral and anterior wall of the antrum is shown, the teeth having been denuded of the external plate of the alveolar process; and, so removed, it will be seen that the maxillary sinus has been opened immediately over the roots of the first, second, and third molars, showing how thin, in this case, the bone is between the roots of the teeth and the floor of the sinus. It is also very thin over the points of the roots of the cuspid and first and second bicuspids.

I wish to draw attention to the position of the infraorbital foramen, which is generally described as the termination of the infraorbital canal, which passes through the solid portion of the infraorbital ridge to the groove in the floor of the orbit. Several of the slides to be shown will show that this canal often passes diagonally through the sinus, somewhat in the shape of a tube,—a point I have not noticed described in any work on anatomy. On the inner side of the orbit is the os planum of the ethmoid bone, and at the inner anterior angle will be seen the opening of the nasal duct; these structures will be again referred to when viewing the internal structures of the nose. We will omit speaking of the lower jaw until farther on.

Slide No. 2 shows a perpendicular transverse bilateral section, made by passing through the anterior portion of the orbit, maxillary sinus, and the first molar of each jaw on either side. The eye has been divided just in front of the crystalline lens. Between the upper portion of the nasal cavities are seen portions of the middle ethmoidal cells. In about the center of the floor of the orbit and roof of the sinus, which is very thin in this case, we find the infraorbital nerve in its canal, as generally described, and, below, the nearly triangular cavity of the maxillary sinus is seen, with a partial septum crossing transversely from the inner to the outer wall.

R 3d M, Roots of Third Molar.
R C, Root of Cuspid.
R F S, Right Frontal Sinus.
R L I, Right Lateral Incisor.
R M S, Roof of Maxillary Sinus.
S M, Superior Meatus; Superior Maxilla.
S S, Sphenoidal Sinus.
S T, Superior Turbinated Bone; Sella Turcica.
Sec, Section removed.
T, Tongue.
U P, Unciform Process; U-shaped portion of Lower Jaw.
V M, Vestibule of Mouth.
W N S, Wall of Nose and Sinus.

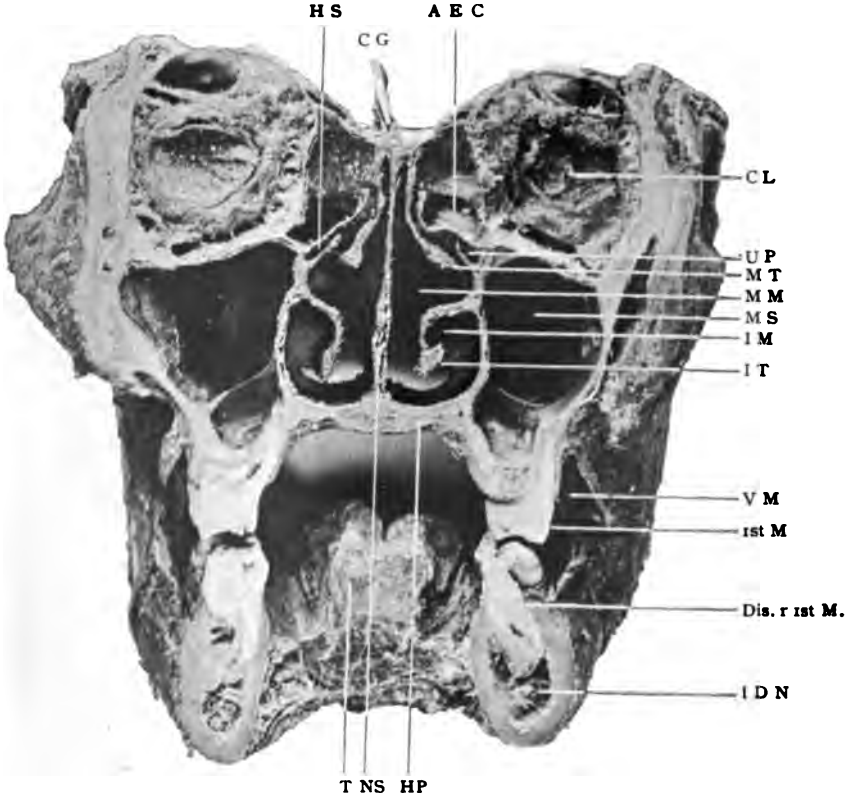
In the angle of the right sinus can be seen the anterior buccal root of the second molar, while on the inner wall is a portion of the palatal root of the first molar. The palatal root of the left first molar is easily seen passing well up in the outer wall of the sinus.

FIG. 1.

The central portion of this and the following slide give a fine view of a transverse section of the nasal chamber. The septum in the center is remarkably straight—very seldom found so straight. Above the septum is the crista galli, to which the falx cerebri is attached anteriorly. On either side of the septum, at its upper attachment, is the roof of the nasal chamber. Running down on either side a little distance from this are the middle turbinated bones, the scroll-shaped bones below, hanging from the outer walls, being

the inferior turbinated bones. The superior turbinated bones cannot be seen in a section in this position, as they are situated farther back. The space from the under surface of the inferior turbinated bone and the floor of the nasal cavity forms the inferior meatus, into which the lachrymal duct empties the fluid from the eyes. The space between the middle and the inferior turbinated bones is known as the middle

FIG. 2.



meatus, through which the frontal and maxillary sinuses have their openings into the nasal chamber. The fluids from the middle and anterior ethmoidal cells also pass through this meatus. Between the walls of the ethmoidal sinuses and the middle turbinated bones is the unciform process. The spaces between this process and the outer walls of the nasal cavities are the semicircular grooves generally known

as the hiatus semilunares. It is through this groove-like place that the excess of fluids passes from the various air-cavities, including the frontal and maxillary sinuses, out of the antrum at its upper anterior corner. Sometimes the opening is in the roof of the sinus, as will be shown. This groove passes backward, the uncinate process forming a guard to the opening of the maxillary sinus and thus preventing any foreign substance passing into the sinus.

We often speak of the fluid passing out of the sinus. It is a question in my mind if such is the case in a normal condition. It is

FIG. 3.

more than likely the law of supply and demand is so governed that the parts are kept moist only, and the opening at the top so arranged as to prevent the undue loss of the fluid. The openings of the maxillary sinuses are at the top, thus preventing drainage while the subject is standing or lying on the back, while the openings of the other air-cells or sinuses are so arranged as to make almost complete drainage.

Sometimes we hear of a "sound" being passed through these openings into the maxillary sinus. This cannot be done in a living normal subject.

The dark space external to the teeth is the vestibule of the mouth. The lower portion of the slide, which includes the lower jaw, will be spoken of farther on.

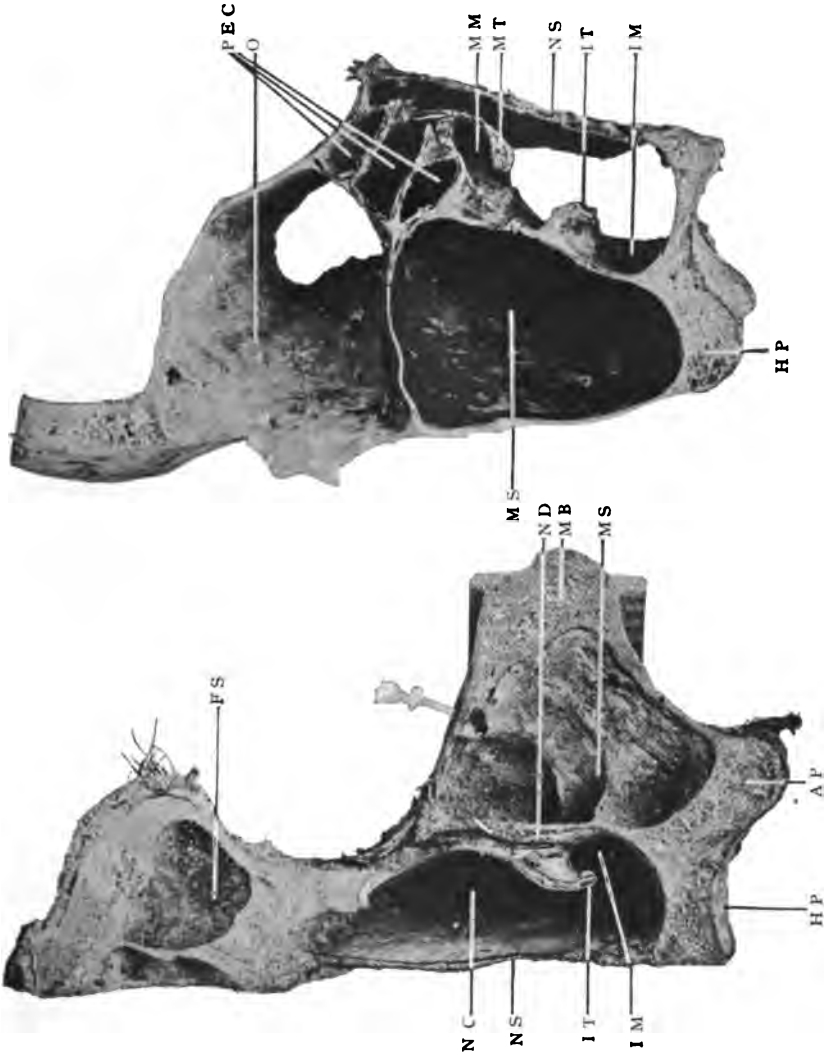


FIG. 4.

Slide No. 3 represents the anterior portion of the same section. At the upper superior angle is seen a string marking the passage

from the antrum into the hiatus semilunaris. In the floor of the antrum will be seen another septum. On the left side of the subject will be observed the anterior buccal and the palatal roots of the first molars, in the outer and inner walls of the antrum. From a dental standpoint, the position of these roots, as shown in this and the last slide, should be very interesting. Abscesses of these roots could very easily open into the sinus. The extraction of these teeth, if not carefully done, would carry away part of the floor of the sinus. Also, by using much force in placing artificial crowns, the floor could be easily fractured. In the case of a breakage in extracting, the roots could easily be forced into the sinus by the use of root forceps.

In the great majority of skulls examined belonging to the white race, roots of the molar teeth either pass up into the walls of the antrum or point directly to the floor, being covered only by a thin, conical portion of bone; and occasionally this lamina of bone is lost, leaving the point of the root uncovered. A specimen will be shown where an abscess has broken through this thin partition into the sinus.

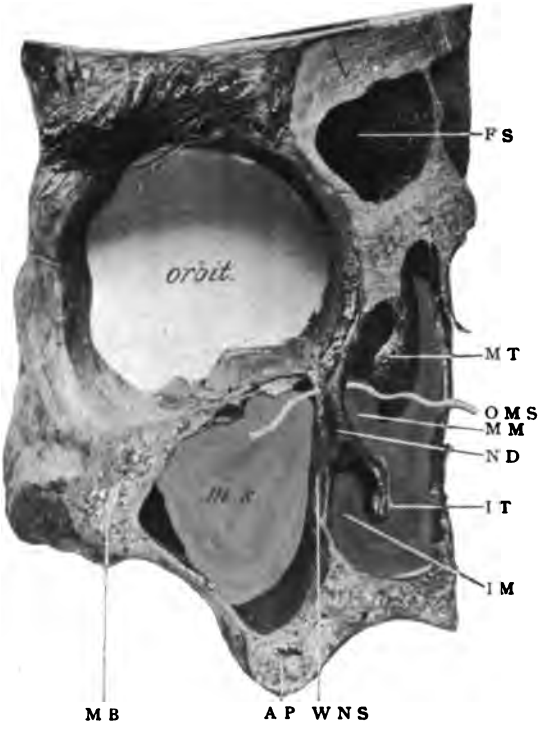
In the colored race the walls and the floor are much thicker; therefore we do not, as a rule, find the roots of the teeth passing up into the wall or even near the floor of the sinus. The relations of the teeth with the sinus vary so much that no set rule can be accepted; in fact, all the bones and structures of the face vary so in themselves and their relations with other structures that the subject cannot be learned from books or by lectures. The student, under proper guidance, should work the matter out by the use of the saw and chisel. In other words, let him make preparations similar to those from which these photographs have been taken.

Slide No. 4. Here are two pictures. The one on the left side is a section made perpendicularly, transverse just within the infraorbital ridge, by taking off the anterior wall of the maxillary sinus. In the upper portion is the anterior wall of the frontal sinus, on the left side the nasal septum, and within the septum the nasal cavity.

The inferior turbinated bone is seen passing from the external wall of the chamber between the upper portion of the turbinated bone and the nasal wall of the antrum. Here also is seen the anterior half of the nasal duct. Commencing at the inner angle of the orbit and terminating in the inferior meatus, the hard palate and alveolar process are seen. They are both about the same thickness in this

specimen. This would not be a good subject for implantation. The right picture is a section made near the posterior wall of the antrum and the orbit, from the same subject as the other. The walls of the antrum, it will be noticed, are very thin, and on the upper right corner will be seen the posterior ethmoidal cells. These exceedingly thin bones usually indicate old age.

FIG. 5.



Slide No. 5 is a section immediately between the two just passed, showing its anterior surface. Near the upper right corner is the frontal sinus. These sinuses vary much in size and shape ; the left may pass far over to the right, or *vice versa.*

To the left is the orbit with part of the eyebrows showing. In the center of the wall between the orbit and the sinus will be seen the infraorbital canal, below which is the maxillary sinus, which in this

case is very large. In the upper portion of the nasal chamber is seen the middle turbinated bone, below which there is a string passing

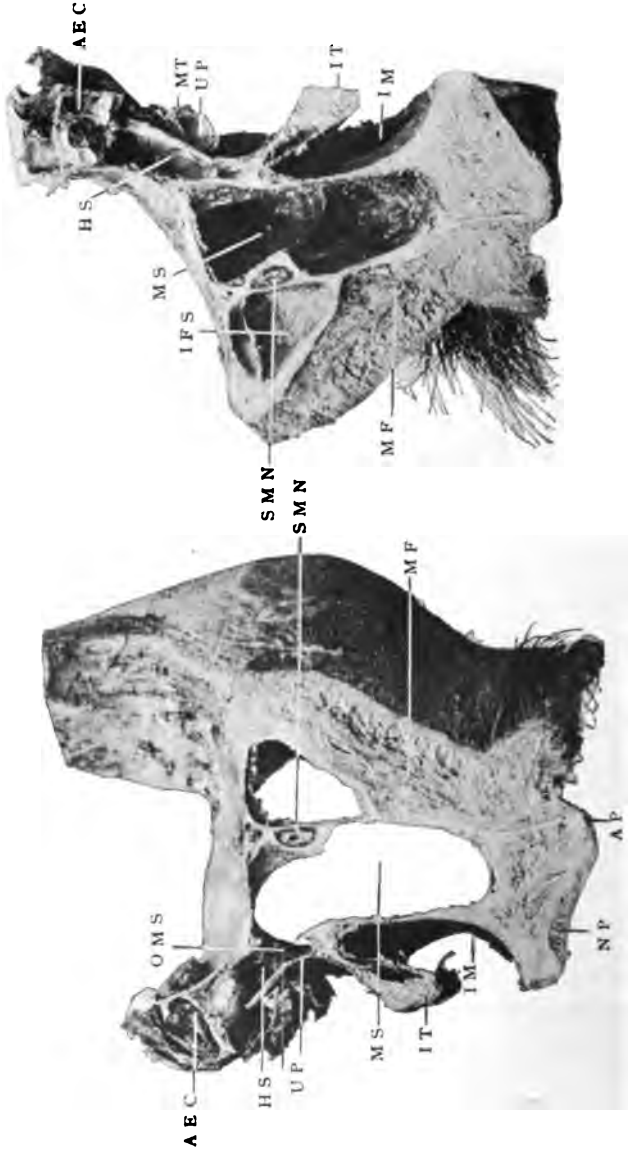


FIG. 6.

through the middle meatus into the opening of the maxillary sinus.

The posterior half of the nasal duct is shown, passing from the inner angle of the orbit to the inferior meatus.

The hard palate and the alveolar process are again shown to be about the same thickness.

Slide No. 6, two pictures, the right showing a section removed from in front of that on the left. When speaking of the first slide, the general description of the infraorbital canal was given. This slide, and a few others following, will show that the description given will not answer for all. These sections were made by removing the anterior wall of the antrum, passing perpendicularly downward. From the center of the floor of the orbit there is a septum, cutting off a portion of the sinus, forming an infraorbital sinus, which of course is continuous with the true sinus. In the center of this septum-like wall will be seen a tube-like canal with the infraorbital nerve in place. Above this and at the junction of the septum to the floor of the orbit is an adjunct infraorbital nerve and canal. At the right, marked H S, is the hiatus semilunaris, into which there are many openings, among them that to the maxillary sinus.

In the right-hand picture, to the left of the septum is the opening from the infraorbital sinus into the true maxillary sinus. In the upper right-hand corner of the sinus the opening into the nasal chamber is well shown, passing into the hiatus semilunaris, guarded by the unciform process.

Slide No. 7 is a sagittal section just external to the infraorbital foramen. In the left picture there is, passing through the foramen and the canal, a piece of paper showing its direction, with a clear space over the tube-like canal. Another point of interest in this picture is the elevation of the bone over the roots of the first and second molars. Also within the floor of the sinus will be seen an opening through which an abscess has broken into the antrum from the palatal root of the first molar.

There are also elevations in the specimen over the roots of the first and second bicuspids, not seen in the picture.

In the left upper corner of the right picture is the outer portion of the infraorbital sinus, the lower border of which is about on a level with the tube for the passage of the infraorbital nerve and vessels. Below this process is an opening through the external wall of the maxillary bone. In this case the maxillary sinus extends into the malar bone. The teeth shown are the outer sections of those seen in the left picture.

FIG. 7.

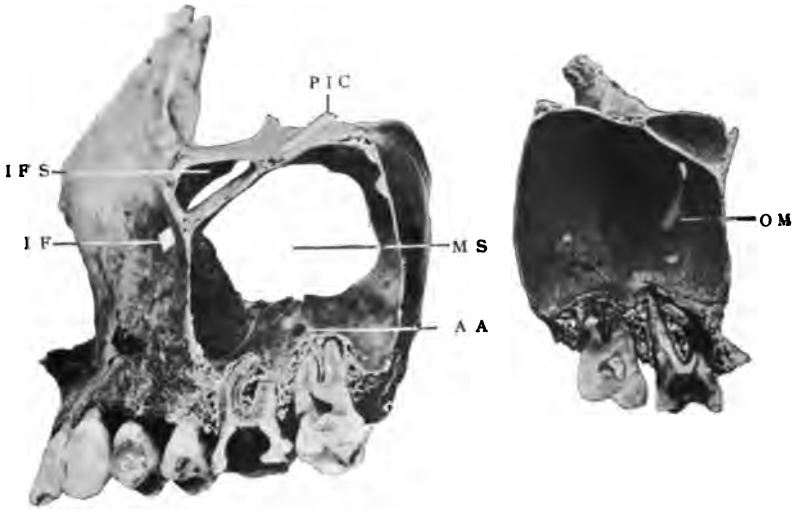
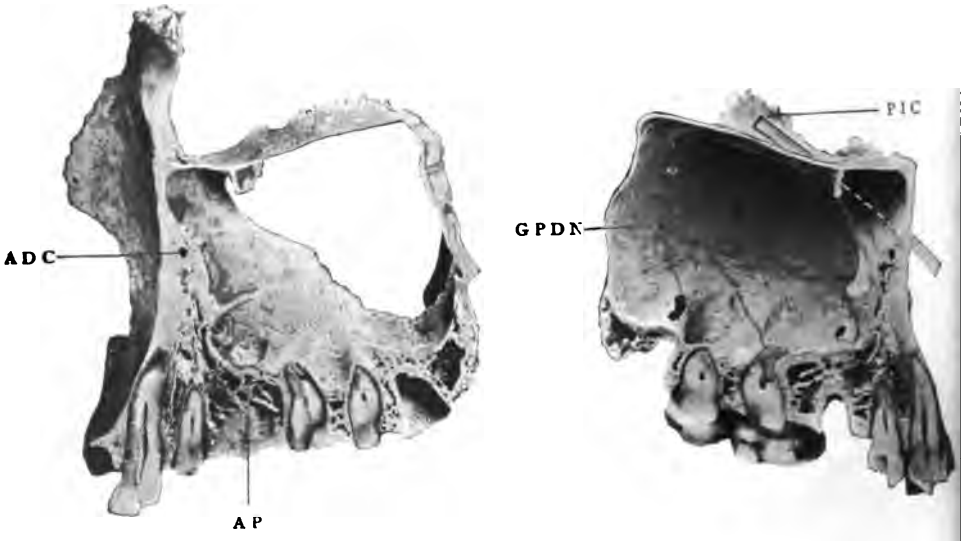


FIG. 8.



Slide No. 8 is somewhat similar to the last one, being a sagittal section made internal to the infraorbital foramen. Here again the tube-like canal passes below an infraorbital sinus, a division of the true antrum. In the left picture, on the outer wall of the sinus will be seen grooves, the principal one running somewhat horizontally forward, giving off branches to the roots of the teeth.

It is often described that the artery and nerve pass to the teeth in the substance of the bone, from the posterior dental foramen in the tuberosity of the bone, and branches are given off in the bony structure.

This is the case only where the alveolar process is very thick and the sinus very small, and the roots of the teeth are not merely covered by a conical portion of bone in the floor of the antrum. But it is found in nearly all cases as shown, the nerves and vessels pass into the posterior dental foramen, then go through the bone into the sinus, passing into a horizontal groove, small branches passing from that to the teeth, the vessels and nerves being covered by the muco-periosteum while within the antrum.

Sometimes these grooves pass into small canals for a short distance. Immediately below the septum of the sinus in the anterior wall are seen several small openings for the passage of nerves and vessels to the anterior teeth and surrounding tissue.

In the floor of the antrum will be seen the conical cap to the roots of the teeth. Posteriorly is an opening over the buccal root of the third molar, anteriorly is an opening over the root of the second bicuspid.

The large opening in the right picture is the ordinary one found leading into the nasal cavity, as seen in the dried unarticulated bone.

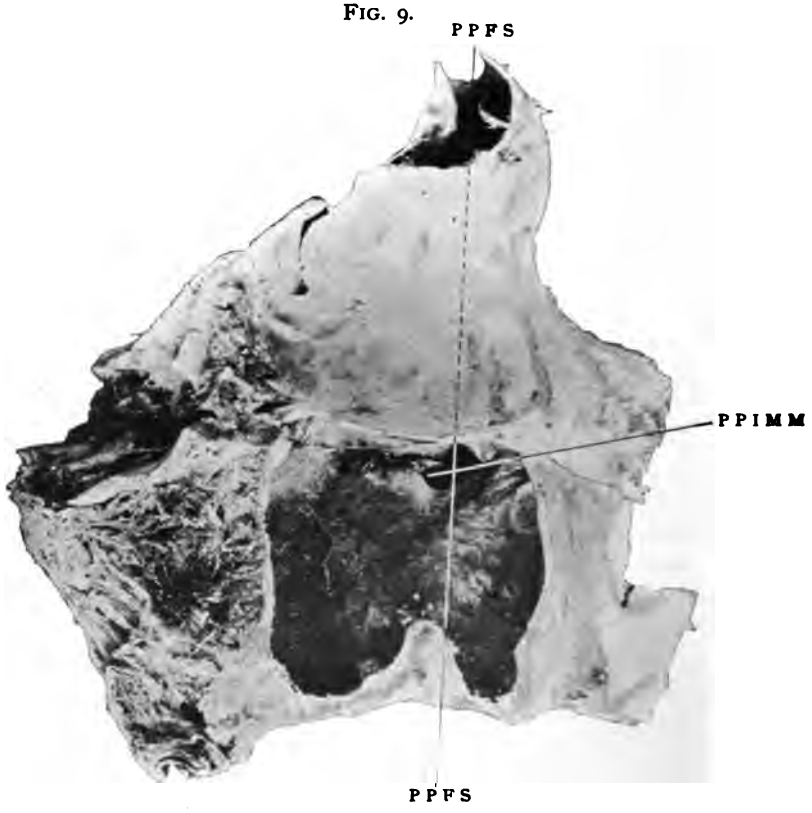
Slide No. 9 is a sagittal section made near the inner wall of the orbit. The frontal sinus is seen at the top, and below this is the inner wall of the orbit, os planum of the ethmoid, including the edge of inner portion of the floor, below which is the internal wall of the maxillary sinus. At the bottom will be seen an elevation of a tooth-socket. This specimen is made from an almost edentulous person.

It is my opinion that, as the teeth are lost, these elevations disappear and the floor of the antrum becomes smooth and comparatively even. The small divisions or septa, as shown in the second and third slides, disappear with age.

To locate the opening and the direction in which the excess of fluid would pass from the sinus, a wire has been passed backward into the

hiatus semilunaris. A perpendicular probe passes through the upper portion of the opening of the sinus, which in this case is partly in its roof or at the angle of the internal wall and the roof; as the straight probe passes out of the antrum, it passes through the infundibulum into the frontal sinus, showing that fluids could pass directly downward from the frontal into the maxillary sinus. These are specimens

FIG. 9.



showing where the anterior ethmoidal cells open just at the maxillary sinus. If the hiatus semilunaris should be closed by pressure of the septum or inflammation of the mucous membrane, the fluids from the frontal and ethmoidal cells would pass into the antrum.

I had a patient during the past winter and spring who was suffering from this trouble, which caused a fistulous opening into the mouth. The sinus was treated for several months without success. The natural

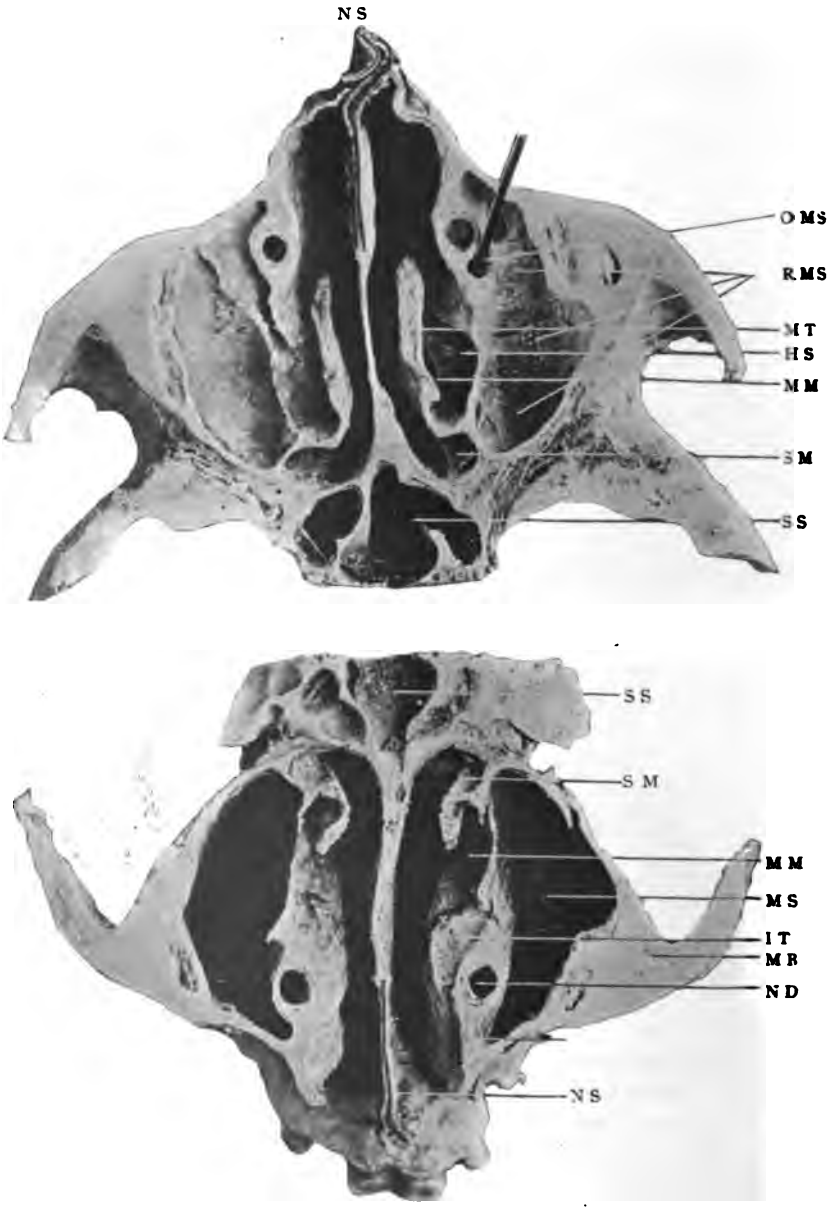
opening of the sinus was closed, as proved by forced injections into the fistular opening in the sinus. The fluid would not pass into the nasal chamber, and finally a large opening was made in the outer wall of the sinus, in order to make a better examination with the finger.

FIG. 10.

There was found a small tumor just below the natural opening. A curved probe could be passed through the opening, in the direction of the frontal sinus. The tumor was then removed and a good-sized opening made into the nasal cavity, the patient recovering in a very short time.

Slide No. 10 is from a similar section of a different subject. It

FIG. 11.



shows the opening of the sinus, running upward, where a small portion of bone has been cut away.

FIG. 12.

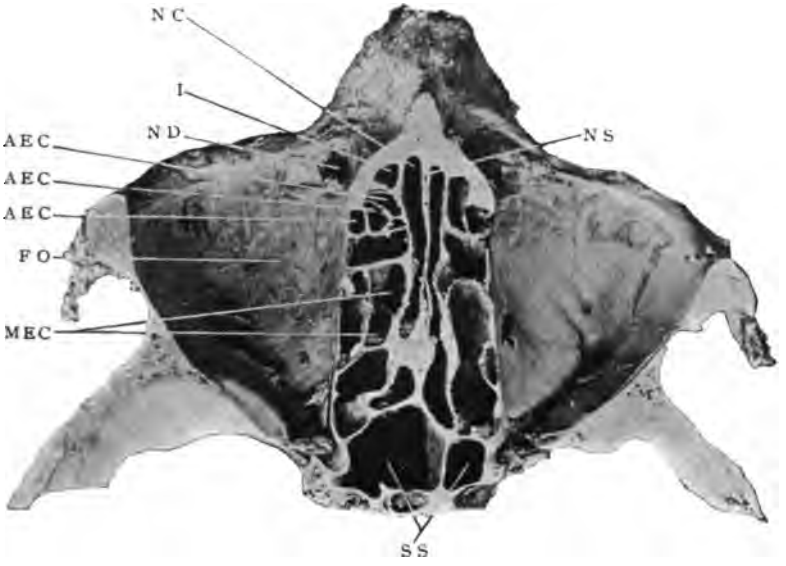
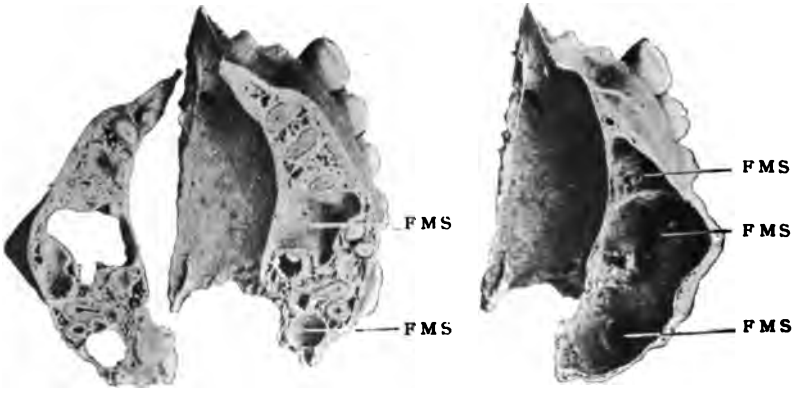


FIG. 13



Slide No. 11 is a horizontal section made just below the floor of the orbit, the upper picture showing the roof of the two sinuses, with the nasal chamber and its septum between them. It will be observed

that the openings of the sinuses were in the roof; on the left side there is a small probe passed into it, on the right side a portion of bone is cut away, to show the direction of the canal-like opening. In the lower picture a fair idea of the shape of the upper portion of the sinus is given. The two round openings seen on either side are for the passage of the lachrymal duct.

Slide 12 represents a section made from the same subject as the last one. It is a horizontal one, made through the middle of the orbit, and gives a good view of the anterior, middle, and posterior ethmoidal cells, and the septum of the nose at its upper portion.

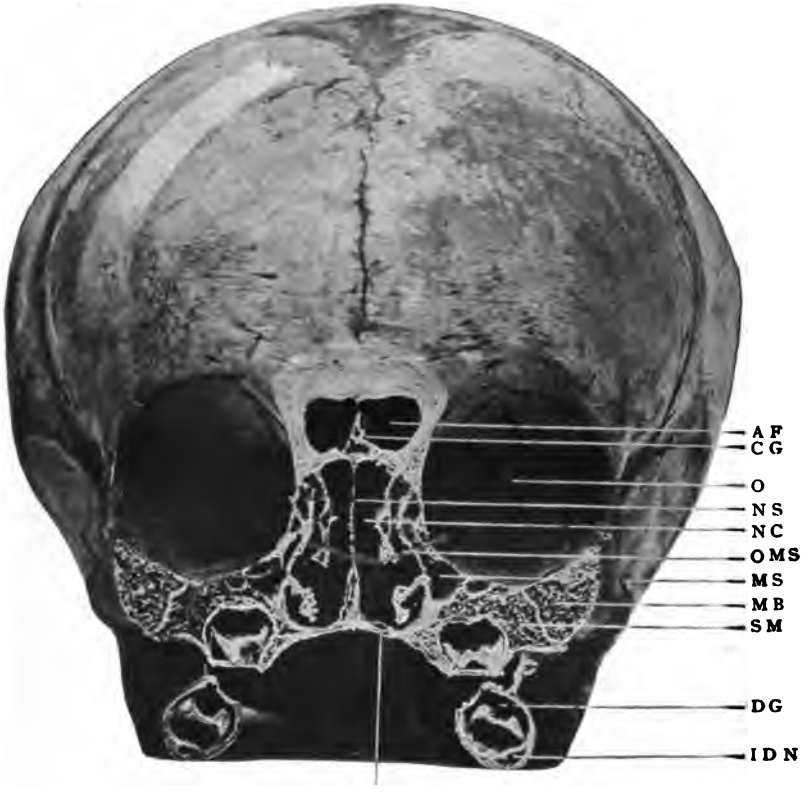
Slide No. 13 is from a transverse section of a superior maxilla. The right picture is made a little above the floor of the sinus. It shows the elevations and depressions in the floor; in the center of the largest depression there is a small spicula of bone, an exostosis, caused by an abscess of the palatal root of the second molar; on the rim of bone just in front of the sinus is a canal for the passage of nerves and vessels to the anterior teeth. The center picture shows where a section has been made a little lower down, through many of the roots of the teeth, although leaving portions of the floor of the sinus in two places. The point of the palatal root of the first molar is in view, with a large opening on its posterior aspect, caused by the abscess spoken of. The left picture is the cap turned over from the middle one.

Slide No. 14 is made from the skull of a seven-months' embryo. It is a transverse perpendicular section, just within the floor of the orbit. In the upper portion will be seen two openings into the brain-case, with the crista galli and the falx cerebri between them; below this the nasal chamber, with its septum. Hanging from the outer walls of the chamber are the middle and inferior turbinated bones. In the middle meatus there is seen the unciform process, passing upward and a little inward from the base of the inferior turbinated bones. To the outer side of this process is the hiatus semilunaris, from which there is a small opening passing into the maxillary sinus, which is very small at this period of embryonic life.

The development of the sinus commences about the fourth month of fetal life by an invagination of the lining membrane of the nose within the hiatus semilunaris, in the position as shown in the picture. At the time the invagination commences and until the eruption of the permanent teeth, the greater portion of the superior maxilla is occupied by dental organs. As the invagination takes place and pro-

gresses, the cancellated portion of the bone becomes absorbed. This absorption of the internal portion of the superior maxilla is carried on in various degrees throughout life, until in old age the walls become exceedingly thin, as shown in slide No. 4. As this absorption takes place, the roots of the bicuspids and molars are

FIG. 14.



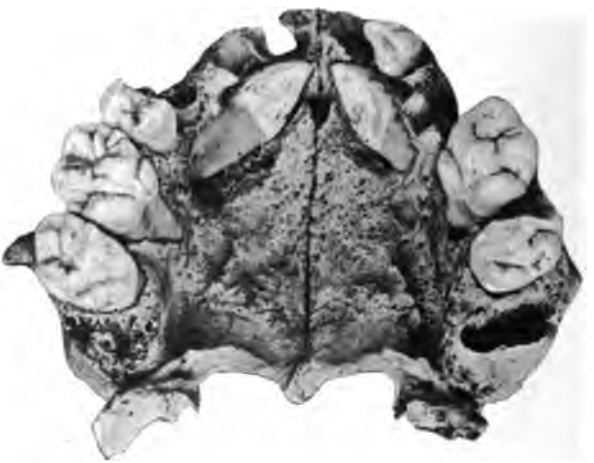
encroached upon until in many cases the points of the roots are covered only by a very thin lamina of bone; even this is sometimes lost, leaving only the muco-periosteum. The re-absorption and enlargement of the sinus occasionally extends into the malar bone, as shown in slide No. 7. At first the sinus is somewhat spheroidal, but it eventually takes a more triangular shape.

The dividing lines between the malar and the maxillary bones are plainly seen. In the lower jaw it will be observed how much space is occupied by the germs of the teeth, leaving very little space below for nerves and vessels.

Slide No. 15 represents three permanent teeth, a central, lateral, and cuspid, which were removed from a living subject about eight years ago. The patient was past middle life and suffering from

FIG. 15.

FIG. 16.



neuralgia. He had no teeth in the process of the right upper maxillary bone, the region of his pain. Most of them had been extracted in the hope of giving relief.

The antrum was opened by Dr. Garretson and myself in search of the cause. We were somewhat surprised to see the three crowns protruding into the sinus; the roots were imbedded in the inner angle of the wall of the sinus. After being extracted by a small tooth

forceps the parts were treated in the usual way, and relief with subsequent cure was secured to the patient.

The crowns, it will be seen, are normal in shape and quite healthy, the roots being more or less defective. The pulps were alive, and it might be said that the nerves were being impinged upon at the points of the roots, thus causing the pain. I have seen several cases where the greater portion of a tooth was found within the antrum, but I think this is the only case where three have been reported.

Slide No. 16 represents two cuspids impacted in the upper jaw, lying at nearly right angles to each other. They were entirely covered by bone, and were exposed by a dental bur. The end of the

FIG. 17.

root of the right one is somewhat curved. There is but a slight layer of bone between it and and the floor of the sinus, which is perforated by three small openings.

The roots of both teeth lie across the alveolar process, which has prevented the second bicuspids from being fully developed. The end of the right lateral incisor has been pushed out of the process altogether.

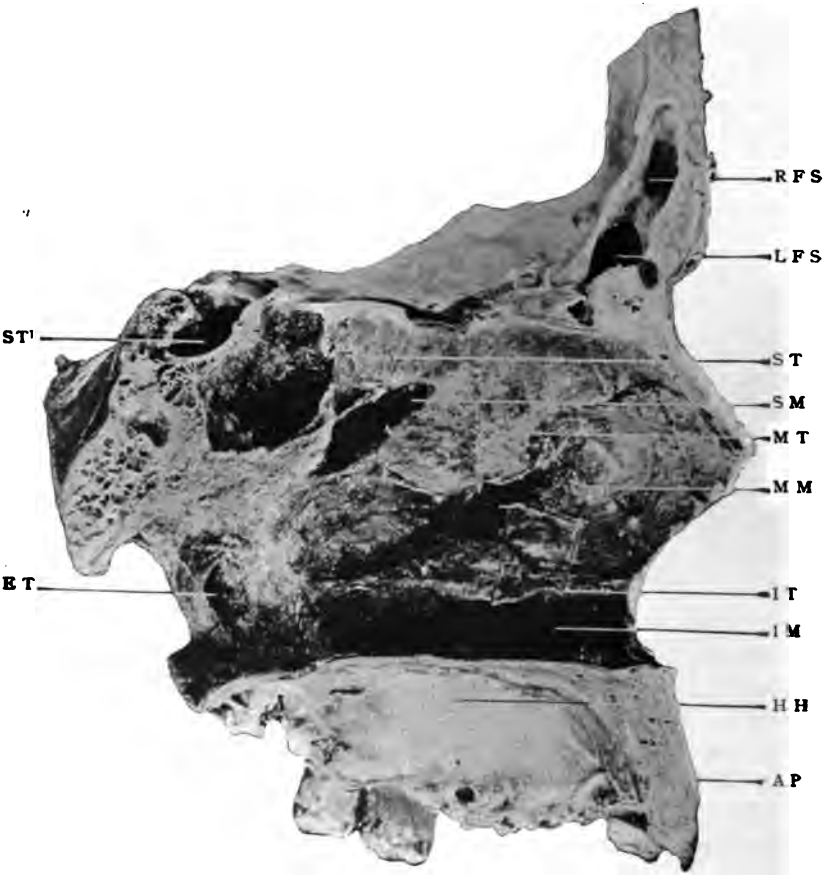
Slide No. 17 is made from the same jaw as the preceding one; it gives a view of right and left sides. It will be observed that the roots of the first molars on either side differ very much from each other. The end of the root of the right lateral shown in the right picture has been forced out of its true position by the impacted cuspid of that side.

Slide No. 18 is a lateral view of the nasal chamber, showing the three turbinated bones and three meati in the central portion. The

frontal sinus is large and well shown. At the right hand upper corner the sphenoidal sinus is shown.

Slide No. 19. This slide is made from the same specimen as slide No. 18, having a greater portion of the inferior and part of the su-

FIG. 18.

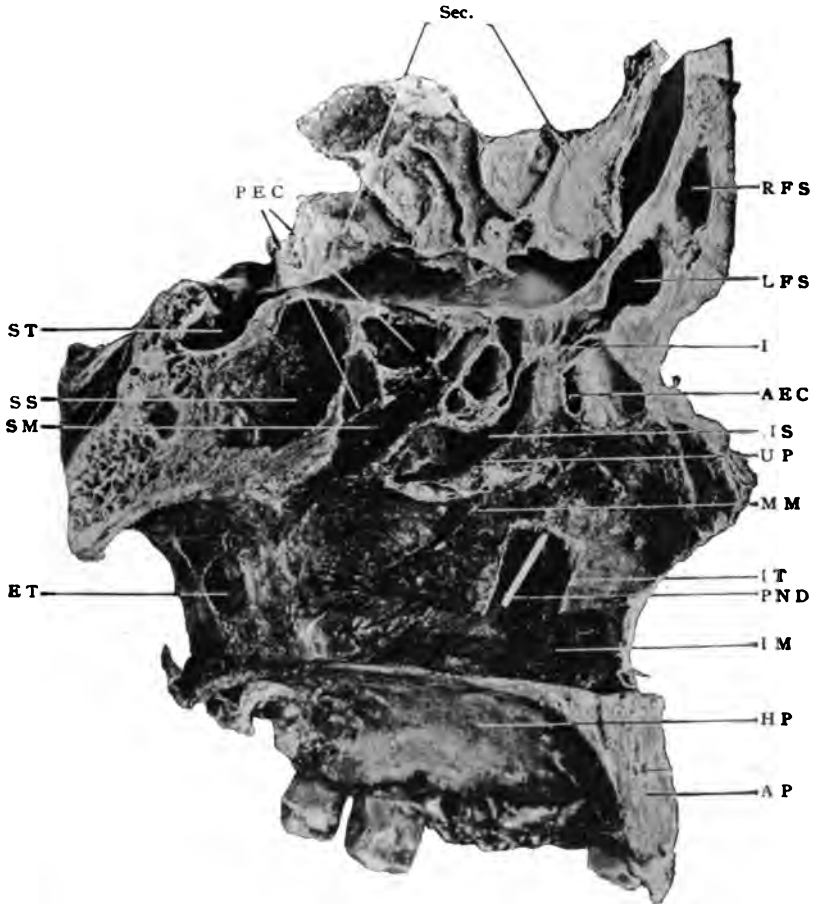


perior turbinated bones removed and turned upward, showing the inside of a lid and the cells below. A section of the inferior turbinated bone is removed, showing a probe passed into the lachrymal duct. The frontal sinuses are well shown, the upper one being the right sinus as it passes over from the right side ; the under one is the left sinus

passing inward and upward beyond the right, there being a very thin lamina of bone between them.

The infundibulum is plainly seen passing to the hiatus semilunaris. The hook-like process seen just below the infundibulum is the

FIG. 19.



unciform process. In the recess back of this is the passage to the maxillary sinus, the process acting as a guard to the opening, and preventing a sound from being passed into the sinus in normal skulls. The anterior middle and posterior ethmoidal cells, and the sphe-

noidal sinus, are well shown. In the posterior part of the nasal chamber the opening to the Eustachian tube is seen.

Slide No. 20. Usually there are three scrolls or turbinated bones, but this specimen shows three well-marked ones and two smaller ones, making five meati and five turbinated bones. In many animals, as the dog and hog, the upper portion of the nose, or that which presides over olfaction, is filled with a large number of scrolls.

FIG. 20.

Slide No. 1, first shown for illustrating the upper jaw, will now be referred to in describing the lower one. The lower jaw is made up of a U-shaped cortical or dense bony structure, the ends of the U terminating in the plates of the alveolar process. It may be said to be open at the top, and in normal conditions the teeth are inserted into this U-shaped space. A slightly compact tissue, somewhat cribriform in character, surrounds each tooth. The remainder of

the space is filled with fine trabeculæ, forming the cancellated tissue through which passes the inferior dental canal, which I prefer to call the "cribriform tube of the inferior maxilla." It passes from the inferior dental foramen forward on the inner side of the ramus of the jaw, downward and forward through this U-shaped space to near the incisors. At first it passes along or near the inner cortical portion of bone; when it gets near the mental foramen it crosses over nearly to the outer cortical wall. Its course after leaving the ramus is in the lower portion of the U-shaped space, and passes beneath the level of the mental foramen. This tube can be isolated or removed from a normal specimen, as shown in slide No. 22.

As the tube passes along it becomes more and more cribriform. Beneath the first molar it becomes so opened that the tube character is almost lost, but passing forward it again resumes its original character.

From this main cribriform tube there are lesser branches passing to convey vessels and nerves to the substance of the bone; also in more or less curved course to the roots of each tooth. A little anterior to the mental foramen there is a cribriform tube passing backward from the main tube to the foramen for the accommodation of the mental nerves and vessels. This return canal is almost invariably the normal arrangement, but occasionally this tube passes from the main tube as it approaches the foramen. It will be seen in the picture that the anterior portion of the wall of the mental foramen has been cut away, thus showing the direction of the returned tube.

The small lateral tubes which serve as nerve-conduits from the main tube to the roots of the teeth pass upward and forward in a more or less curved direction, varying according to the position of the tooth, those going to the third molar passing almost vertically upward; in those to the second molar the forward direction is greater; in those to the first molar it is increased still more; that to the second bicuspid has the longest curve of all. Sometimes, instead of commencing at the main tube, the tube passing to the second bicuspid is an offshoot of that to the anterior root of the first molar. The tubes going to the before-mentioned teeth all curve forward and upward from the main tube posterior to the mental foramen. The small tubes going to the roots of the first bicuspid and cuspid are branches from the recurrent tube to the mental foramen, and are curved slightly backward as they pass to these teeth. The tubes going to the two incisors curve slightly forward as they pass upward to the roots.

The finer tubes going to the interspaces and general cancellated tissue have the same general direction and curvature as those going to the roots of the teeth in their immediate vicinity.

The cortical U-shaped portion of the bone is the framework of the jaw, and forms the supporting structure; but it increases in length and breadth in a different manner from its contents. It is more than likely that it grows by interstitial process, each half having three fixed points,—viz, the ramus, the mental foramen, and the symphysis menti. There is no doubt that the distances between these points increase. The contents of this U-shaped space slide forward as the

FIG. 21.

cortical structure increases in length, the teeth posterior to the mental foramen being pushed forward by each successively erupting molar, thus giving the curvature to the various small tubes going to the roots of the teeth, etc., and accounting for the stretching of the main tube until its character is almost lost under the first molar. This also explains the recurrent feature of the tube in relation to the mental foramen. As its end is attached to the walls of the foramen, the mass of cancellated tissue is pushed forward in its process of growth, and the tube itself is carried with it, making a loop. The reason that the small tubes going to the first bicuspid and cuspid

curve backward is that their points of origin have been carried forward with the return tube, as they belong to that portion of the tube. The small tubes going to the incisors curve slightly forward as they arrive from the continuation of the main tube near the point where it curves backward to the foramen.

Thus we see that the anatomical structure, the relations of the various teeth considered in connection with the order of their development, and more especially the direction which the lateral branches of the main cribriform tube take in connection with the roots of the several teeth, furnish us with a permanent record of the method of growth of the inferior maxilla during the period between childhood and adult life.

Slide No. 21 is the left side of the lower jaw of slide No. 1. It is enlarged, showing the fine net-work of the cribriform tubes throughout the cancellated tissue; in fact, they form the greater portion of it, the special ones passing in a slightly curved direction to the roots of the teeth. A wire in the mental foramen gives the direction of the return tube or canal.

Slide No. 22 is taken from a specimen where the cortical and cancellated tissues have been cut away, leaving the cribriform tube isolated, showing it as an independent structure, and not merely a canal through the bone.

Referring to slide No. 2, we see that the right side gives a good idea of the U-shaped cortical portion of the bone heretofore spoken of, with the tooth-root passing into it. Below the root is the cribriform tube and the nerves situated within it. This gives an idea of the position of the nerves below the root of the first molar. It can be imagined what damage would be caused by a discharge of infectious matter from this root within this cancellated tissue.

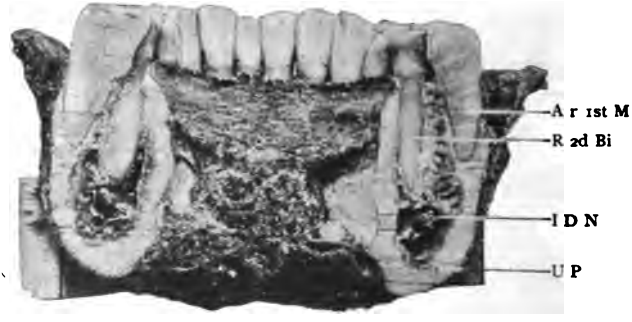
The slide also shows the floor of the mouth and tongue cut transversely.

Slide No. 23 shows the anterior portion of the lower teeth in position. The principal object in showing this slide is to explain why it is often difficult to extract the second bicuspid in a jaw that has lost no teeth. It will be seen in this case, a transverse section, that the roots of the second bicuspid are nearly in a line with the anterior root of the first molar. The roots are also very long, extending below the root of the molar and nearly down to the inferior dental nerve. The bone at this point is usually more compact than farther back. Taking these points into consideration, we can account

for the difficulty in extracting these teeth without breaking them, and of course we must also consider that the root itself is not a strong one.

FIG. 22.

FIG. 23.



Slide No. 24 represents the lower jaw cut lengthwise nearly through its center, exposing the cancellated tissue, the sockets of the teeth, and the cribriform tube or inferior dental canal, with its branches going to the sockets of the teeth. As the tissue is very frail, much

of the trabeculæ is lost. The outer section shows the direction of the recurrent tube for the accommodation of the mental nerve and vessels.

Slide No. 25 represents a metal cast showing the size of the cancellated structure within the U-shaped portion of the body of the bone. It was made in the following way: After the openings of the

FIG. 24.

sockets of the teeth were covered by pieces of paper, a slender tube about eighteen inches long was attached so its lower opening was in connection with the inferior dental foramen. The bone and the lower end of the tube were invested in plaster of Paris with a little asbestos. After it was thoroughly set and dried, and made about the temperature of 212°, fusible metal was poured into the tube, passing along the metal tube into the canal or cribriform tube and along its course, sending the metal out through its many openings into the cancellated

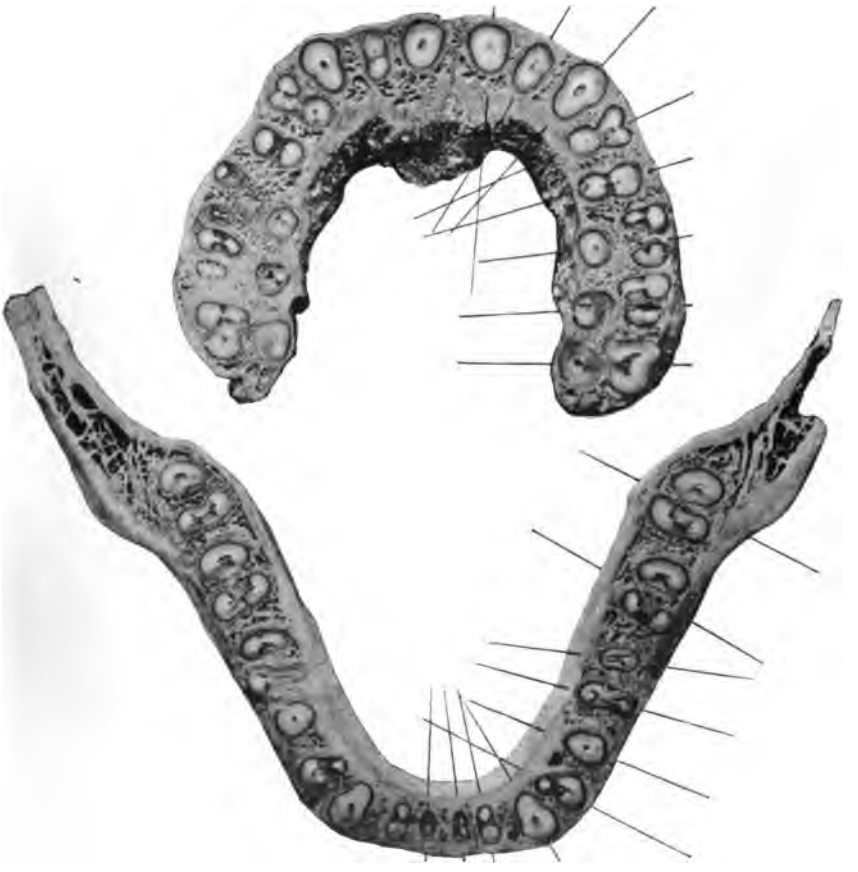
tissue and the sockets of the removed teeth. The body of the bone and the lower portion of the ramus were placed in a ten per cent.

FIG. 25.

solution of caustic potash. This dissolved the bone away, except particles seen as white spots which penetrate the metal through the cancellated tissue. A transverse section of this preparation would show fine bony tissue passing all the way through.

The upper picture represents the inner surface, showing the size of

FIG. 26.

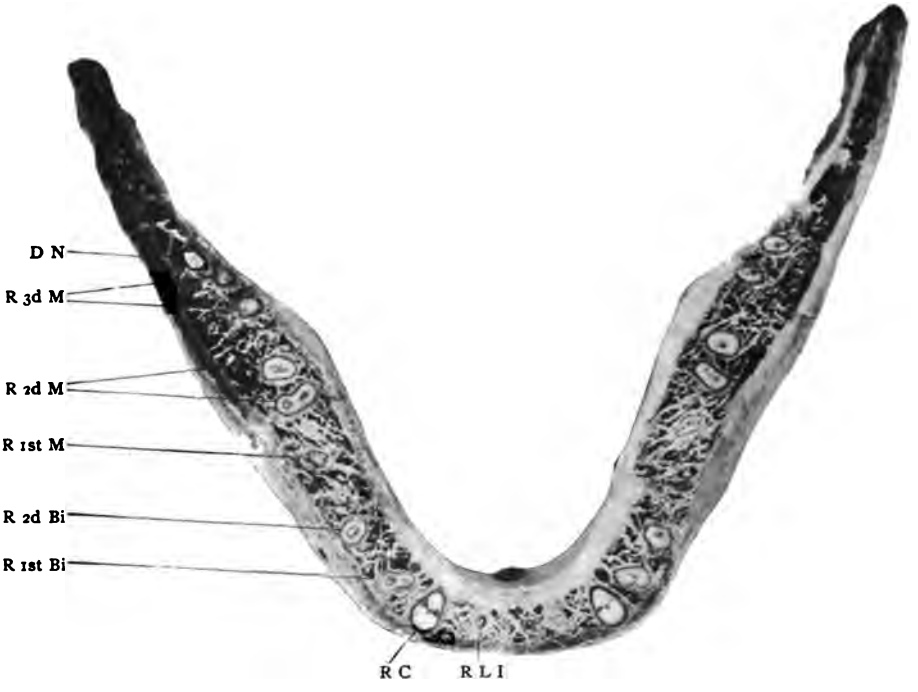


the canal or tube, and it might be said that it represents the space occupied by the nerves, blood-vessels, and their membranes. The lower picture shows the outer surface, and the projection seen is where the nerves and vessels pass out of the mental foramen.

Slide No. 26 shows horizontal sections of the upper and lower jaws.

They are made a little above the free margin of the alveolar process of the upper jaw and a little below that of the lower. It gives the shape and position of the various roots, with their relation to the process and to each other. Particular attention is drawn to the fact that there is so little space between the roots and the plates of the alveolar process at the line of the section that it would be impossible to force the beaks of forceps between the roots and process without

FIG. 27.



breaking the latter on one or both sides. The lines in the cut represent the strongest axes of the teeth.

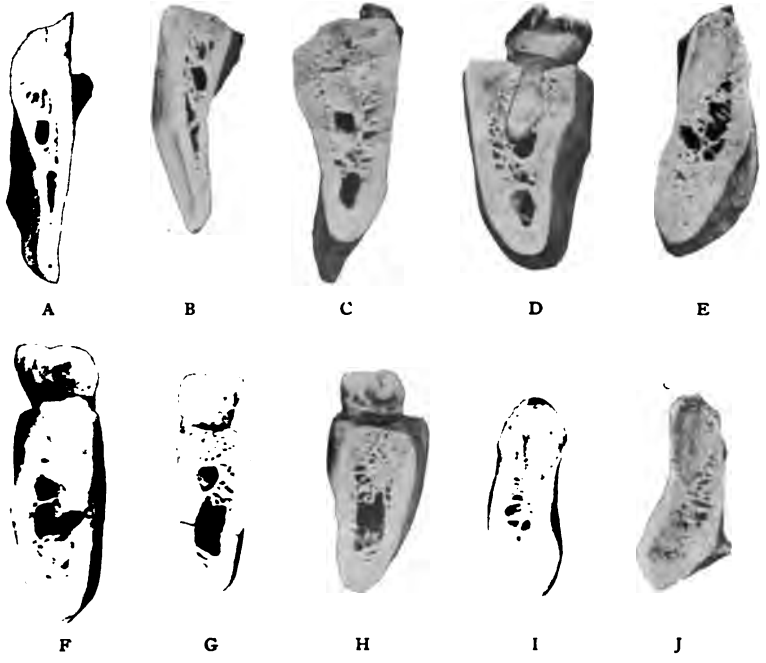
Slide No. 27 represents a section cut horizontally through the lower jaw, made near the ends of the roots, from the same subject as the last slide. The cancellated portion, with the soft tissue filling the spaces, is well shown. At the posterior part of the picture the nerve is seen passing into its tube. The ends of the roots of the second and third molars, the tip of one of the roots of the first molar, the roots of the

first and second bicuspids are plainly seen. A little of the lateral incisors will be noticed. The centrals do not go down so far.

The illustrations we have been going over represent the lower jaw in the normal state. Those following will show various conditions of abnormality.

Slide No. 28 represents several sections of a lower jaw, not quite normal, there being evidences of past inflammation. Several teeth have been extracted before death, which changes the character of the

FIG. 28.



jaw. Some of the sections show but one canal, while in other places there are many, and it takes close observation to tell in which the nerve and vessels have passed. In the operation of making a section or removing the whole nerve from the bone, a surgeon not familiar with this condition of things might easily clean out a portion of a canal, but not touch the nerve. This accident might not happen in a dried bone, but in the living the parts are so vascular, mistakes could easily be made.

At section D it will be seen that the root of the second molar penetrates the true nerve-canal. In the case of an abscess of this root, the discharge would flow into the nerve-canal; from this it could pass backward or forward along the nerve, and would give great pain by compression.

A baffling case of abscess on the external part of the lower jaw, just above the facial notch, can be explained, I think, by this specimen. The patient suffered great pain in the lower jaw. Finally a swelling made its appearance; the first molar was much diseased and was extracted, but this gave no relief. The swelling was lanced,

FIG. 29.

and a small quantity of pus was discharged through the opening, but this discharge continued for two months, when the patient came to the hospital and was treated in various ways without success.

The teeth were passed by for a time as being the cause, and cultivations were made from the discharge, to see if it were a tuberculous disease, but without results. The discharge was then examined by the microscope, to see if there were salivary corpuscles in it, but none were found. The second molar was in position and responded to heat and cold; finally a rubber-dam was placed over the second molar, and, gently approaching the pulp-chamber, it was ascertained that the nerve in the distal root was in a decomposed state, while the anterior branch was vital.

This was devitalized at once and the decayed matter removed from the distal root, after which carbolic acid was forced down into and through the root by the use of softened gutta-percha.

In a short time the carbolic acid made its appearance at the external opening on the jaw. The tooth was filled with gutta-percha and the patient dismissed. From 4 P.M. until the next morning carbolic acid worked out through the opening, when the parts closed and did not again open. The question was then asked, how could a bone fistula close so quickly, and why was there no discharge of broken-down tissue through the opening?

That can be explained by this section. If the discharge from the patient's tooth flows into the canal, like the one shown, it would have an easy passage along the canal, backward and out of the foramen, then down along the bone until it came in contact with the sheath of the internal pterygoid muscle, which could direct it into the submaxillary triangle, when it would pass out at its weak point, the opening for the facial artery. If such were the case, carbolic acid would clean this fistulous canal in such a manner that it would heal up at once.

Slide No. 29. Since making the preparation for the slide just passed, I have found a specimen where the roots of a third molar passed out through the inner wall of the lower jaw, a considerable distance below the mylo-hyoid ridge, as shown in the picture before you.

If this tooth had become diseased, it would have discharged its matter at once into the submaxillary triangle. I fully believe there are many unrecognized serious cases where teeth of this character, when devitalized, are causing pus to pass into the tissue of the neck, and even into the thoracic cavity. If diseased teeth in this region do not respond to treatment at once, they should be extracted. It is of much more importance than the saving of a tooth, as not only can ill health result, but death itself may often occur.

Slide No. 30 represents two views of an impacted third molar. In the upper one the tooth is in the position found when the cap of bone was removed; the second view is where the tooth has been rolled out of its socket, showing its inner surface. The bed of the tooth is also shown. The second molar is a devitalized tooth, the distal root of which shows where the impacted tooth has pressed against it. Not only has it done this, but also caused absorption of a portion of the root until the pulp-canal within the root is fully exposed, and must have caused neuralgia in these parts. The roots of the impacted teeth have a slight curve inward at their points; the concavity lies

immediately over the inferior dental nerve, and more than likely caused pain by pressure.

FIG. 30.

The ends of the roots are not fully formed, the apical openings being large. It will be noticed that the roots of the teeth in this jaw are longer than usual, the cuspid passing below the nerve and to its outer side.

Slide No. 31 represents another impacted third molar, situated on the inner side of the jaw, and pointing slightly downward. The

FIG. 31.

distal root of the second molar is slightly absorbed. On uncovering the tooth and taking it from its bed, it was found to be incased in a thin shell of bone as though the dentinal sac had ossified separately

FIG. 32.

around the tooth. The inner portion of this shell is still in position ; the nerve with its accompanying tissue is seen passing into the inferior dental foramen immediately against the shell, and has the appearance of being flattened out ; it divides and sends a branch

around the internal half of the shell. Here again must have been an obscure cause of neuralgia.

Slide No. 32 is made from the left and right halves of a lower jaw, one showing the internal surface of the right half, while the other shows the external surface of the left. In that of the right we find the roots of the third molar curved backward. It is also enlarged by an abnormal deposit of cementum until the independent character of each root is lost. This, I think, has been caused by the vascular excitement localized in these parts.

Not only have the roots become enlarged, but the surrounding bone has become much thickened, and the cancellated tissue of the jaw has lost its fine structure and become more solid.

FIG. 33.

It would have been impossible to have extracted this tooth without breaking quite a large piece from the inner side of the jaw. A fracture at this point often produces serious results; the mylo-hyoid artery is liable to be lacerated, or even broken, and the hemorrhage is difficult to control. The consequent inflammation will often cause the lack of free movement of the jaw. It also interferes with deglutition, speech, etc., and even the glottis may become closed.

The left half of this jaw shows an impacted tooth pushing directly against the tooth in front of it. The roots of this tooth have become much enlarged by deposit of cementum. The surrounding bone is also thickened and more compact.

Slide No. 33 is taken from a section made transversely through the lower jaw at the mental foramen of each side. On the left side the cortical U-shaped portion of the bone and the cancellated tissue are in about a normal condition, while on the right side, the cortical U-shaped portion and the cancellated tissue have changed. The former has thickened and become more dense, while the latter has become filled with secondary bone deposit. The only reason that can be given for this difference is that all the teeth on the left side were in good condition, while on the left side the first molar had been much diseased, causing an inflammation of that side of the jaw, the vascular excitement having caused the activity of the osteoblasts of this region to build this bone.

DISCUSSION.

DR. BARRETT: Mr. President, it was my pleasure to examine the specimens of which these are photographs this afternoon, and I must say that they were a revelation to me, and that they have materially modified some of my previous views of anatomy. There are very many points that are made quite clear by the specimens themselves, which are not presented so well in the photographs as projected upon the screen. There is probably no practitioner of very large experience who has not had cases, in diseases of the antrum, which to him were incomprehensible, in which he could not make a clear and perfect diagnosis. Such a one occurred in my own practice not long since. I operated upon it, opening it three several times, and finally I opened through the external alveolar plate and through the alveolar process, until I could explore it with my finger. I expected to find a foreign substance or tumor, but I discovered absolutely nothing that seemed to be a sufficient cause for the amount of discharge and for the disturbance there existing. I am satisfied, after seeing the specimens of Dr. Cryer this afternoon and after thinking over the subject, that there may have been a continuous discharge from the frontal sinus down through the infundibulum and through the ethmoid into the maxillary sinus, instead of into the nasal sinus. The specimens which he has show so clearly the possibility of penetration, through the canals being so nearly in relation to each other, that it seems to me very probable that was the case.

Another point is in regard to the frequent neuralgias which we find in connection with the inferior maxillary. The doctor has shown that not infrequently is it the case that the root of an inferior tooth,

especially of an impacted tooth, may penetrate within or impinge upon the inferior maxillary canal, and thereby cause a continued irritation. I know that I have seen cases easily explainable in this way which otherwise seemed incomprehensible.

He affirms the cribriform formation of that which incloses the dentinal canal. I should have to think that over and examine more specimens, and do it more exhaustively than I have examined these, before I should be ready to express a positive opinion upon that, and also concerning the kind of structure intermediate between the inferior dental canal and the roots of inferior teeth. Whether that be an open passage would have to be determined positively by injection of the inferior maxillary canal. That might be done, and Dr. Cryer promises that he will demonstrate this until he is entirely satisfied. The ones which he has filled with the fusible metal do not clearly indicate anything, because you cannot trace the trabeculæ of the bone.

I wondered this afternoon what on earth I came here for. Many of the points brought out in the papers and discussions, which were of interest to others, were not those that specially engaged my attention, but Dr. Cryer has repaid me a hundred times over for coming, because in the beautiful dissections which he has made I have been able to see absolute demonstrations of points which were before unknown or doubtful. It seems to me that these illustrations and specimens incontestably demonstrate some of the aberrations from ordinary normal structure in bone, and will account for a great many of the pathological cases which otherwise would be incomprehensible.

I think we shall find in a careful study of what has been here presented the real key to the clear, correct diagnosis of very many cases that have heretofore puzzled the very best pathologists.

DR. MARSHALL: I want to express my appreciation of the work of this evening. Especially, however, do I want to thank Dr. Cryer for what he has done in this line. There are so many points which he has brought out that are new and startling that there would not be time to speak of them all, and I am going to refer to only one. That is the location of the opening into the antrum. You know the later theories and methods of treatment coming to us from Germany have advocated the treatment through the natural opening from the nose. Almost all of the German surgeons nowadays advocate that method. I have made attempts in that line and have succeeded

sometimes, but in the majority of cases I have not been able to pass the probe into the natural opening of the antrum through the nose. These illustrations explain why. I have always tried to pass it into the middle meatus about an inch and a quarter or an inch and a half from the nostril, and I have worked sometimes an hour, of course under local anesthetics, to find that opening; but in the majority of cases I have failed to find it. Consequently I have not made very many efforts to treat antral disease through the natural opening. I think I shall make fewer attempts hereafter to do it in that way, because I shall expect to fail if this is a correct presentation of the conditions in the antrum and nose.

DR. PATTERSON: The continued pain which we often find resulting from the extraction of impacted or partially erupted third molars following for days and weeks, and even sometimes for months, finds ready explanation after this exposition. The difficulty of their removal requires sometimes a great deal of force. The roots are pressed upon the nerve territory where they enter, as we see, and consequently the nerves are bruised and left in such condition that pain results, and is for a long time continued,—a thing which is very hard to control, from which nothing but opiates seems to give the slightest relief. The difficulty in diagnosis for these pains is by this exposition made simple.

DR. THOMPSON: It occurred to me that this study could also be made interesting in following up the development of the head from early stages,—from the time of the first formation of the skull, onward. That would illustrate the development of some cavities, and perhaps also the origin of the new sinus to which the doctor called attention, which is itself very interesting and almost partakes of the nature of a new discovery. I desire to express my personal thanks and congratulation to Dr. Cryer for his work.

DR. BROPHY: It seems quite likely that Section VII will not have an opportunity to present anything more during the sessions of this Association than what has been presented this evening. As Chairman of that Section I feel very proud of the work that we have done. I feel that we have accomplished a great deal in the presentation of this subject this evening, and in the event of our not being able to bring before the Association the additional matter that we have, which amounts to a good deal, we certainly shall feel satisfied with this. There is so much to think of in connection with the preparations that have been exhibited here this evening, not only by

Dr. Cryer, but also by Dr. Abbott; they have so much to do with the treatment of oral diseases, that it is almost impossible even to allude to more than a few of them.

I do not quite agree with the gentleman in changing the name of this passage to a tube. It has been so long known as the inferior dental canal, and our meaning is so well known when we speak of the inferior dental canal, that I am of the opinion that it will be better to retain that name than to adopt a new one. I took occasion to interrupt the speaker and call attention to the fact that we might have in these cases excementosis, and thus have pressure exerted on the inferior dental nerve producing the exciting causes, or establishing the real neuralgia which we have in these cases and which we cannot easily diagnose. Gentlemen, I believe this is also true in the case of the young, of the infant who is passing through the period of the eruption of the teeth; and while my friends usually hold that the eruption of the teeth is purely a physiological process, there are times when that physiological process is interfered with, and we have a purely pathological condition established from this pressure alone. For if the process of absorption of the tissues covering the enamel of the tooth does not go on equally with the process of development of the root, we have exerted upon the inferior dental canal a pressure which will be the exciting cause of pains and disturbances throughout the general system.

The relation of the frontal sinuses to the antrum opens up a new field for investigation. While it has been known that this relation sometimes existed, I do not think it has ever before been so conclusively or clearly shown as it has been this evening. I wish personally to thank Dr. Cryer for his work in this direction.

I should like very much to know if it is not possible for us to secure specimens such as these, or slides such as these that have been exhibited to us this evening, for the purpose of spreading this information among the students of the various colleges of our country. I do not know that it can be done, but I presume it can, and if we can secure duplicates of these slides that have been used here this evening it will very greatly facilitate the work of teaching the anatomy of these parts to the students in the dental colleges of our country. Let me say also that I think the illustrations here this evening will show the value of the careful study of anatomy in our dental colleges.

DR. STELLWAGEN: I have long desired such a series of sections as we have had exhibited here this evening, having long felt con-

vinced, from the examination of a number of specimens of the mouth and the superior and inferior maxillæ, that this condition, which we see here so distinctly illustrated, existed; namely, that the antrum was not a simple cavity, but a compound one. Many years ago, in attempting to treat several of these cases, I found that it was not possible to satisfactorily wash out the antrum through a single small opening. In almost every case where there is antral trouble we can treat it in one-half the time or perhaps less by having two openings. The one which is preferable to use for the purpose of washing out and the injection of medicated fluids should enter from the vestibule of the mouth, penetrating the front of the alveolar process, where the incisor and cuspid teeth are involved, or from the side for the premolar and molar teeth and the other in the roof of the mouth. In many cases where the teeth have been the initial cause of the complication, there does not require to be any bone removed from the palatal process to pass up through it into the antrum. In a majority of these the osseous structure of the antrum's floor has been absorbed or removed, so that for the penetration of the cavity the ordinary lancet is sufficient. The most convenient form for the purpose is one with a sickle shape or curve. To pass through the process from the front is an operation so trifling that it is hardly worth dwelling upon here. Yet there appears to be a wonderful modesty, or delicacy, or timidity about opening through this very thin plate of bone. With the bur and engine it is often far easier to cut through than an ordinary visiting card. Syringing the cavity is a most simple operation when there are two holes, one for the inflow and one for the outflow of the fluid.

A few weeks ago a case was treated by me where following the death of the pulp of a right lateral incisor and subsequent formation of a cystic cavity around its root, the pus had burrowed until the cystic cavity had become one with the maxillary sinus. The condition was diagnosed at a glance, and with a lancet I opened through the floor of the antrum with a decided cut of perhaps a quarter or half an inch in length.

Some years ago when proposing this method of procedure to a prominent surgeon in our city he said, "Why, Stellwagen, if you do that you will never be able to get the wound closed." "Well, suppose that I stimulate with iodin?" "But if you put iodin into the antrum you will kill your patient." When he advised me it would kill the patient it satisfied me that it was good practice, and within an

hour the cavity was well washed out and injected with a solution of tincture of iodin and water. The patient quickly recovered, showing improvement within a few hours; and in a few days he was practically well, and has now lived many years.

DR. MARSHALL: What strength iodin solution did you use?

DR. STELLWAGEN: Sometimes I would use a saturated solution, and sometimes a few drops in an ounce of water. We not infrequently lay too much stress on the strength of the application. A very strong or saturated tincture of iodin must be put on by a drop here and there, allowing it to be diluted by the contents of the cavity. If it is desired to rinse out the antrum, then drop it into water until the fluid is decidedly colored. If a small quantity of strong tincture of iodin is used it will diffuse itself; it will be diluted by the fluid contents.

After washing out such a cyst a few weeks ago for a lady who had long suffered from this trouble, and sending her to the seashore to get the tonic effect of the atmosphere there, to my utter amazement she returned after three days, healed. I did not even attempt to pass a probe in through the roof of the mouth, for the fistula there seemed to have completely closed. I did pass a probe daily for two or three days through the front opening. It is likely that there will be a little fistulous passage through the alveolar process immediately adjoining the root of the tooth. Such an opening is a very excellent safeguard. It is to these cases about what a safety-valve is to an ordinary steam boiler. The cyst rarely will enlarge as long as that opening is there.

This operation is very simple, often quite insignificant, and yet it has been surrounded by such an amount of precaution and expressed dread that it seems our young men have been frightened by it. Some years ago, a very prominent editor of one of our great medical journals brought his wife to me for an examination of her mouth. A small, ordinary fistulous opening from what had been an old abscess at a tooth-root was found. She told me that she had been for three months under treatment, having it packed daily, and that she was in great dread of some very serious complication. After looking at it again and begging the doctor to examine it, he declined to take any responsibility. I said, "Madam, you have nothing the matter with you but a trifling fistula here, which under the present conditions is a good thing; it is best let alone." She looked at me with astonishment, as she thought she would die from pyemia if some one did not

put something in to disinfect the cavity. My advice was "to go home and return to-morrow for a second observation." The next day I sent her back home, with directions to come again in a week. The next time she left to come back in about a month. This lady remained under my care for other dental operations for many years, and never had any more trouble from that fistulous opening. I have probably a half dozen of such in my mouth, and for years have not thought of them except as so many lessons to avoid meddling with and worriment over such unimportant matters.

DR. KIRK: I have been very much interested in the discussion of this paper, and in this exhibition given by Dr. Cryer. We have heard it stated here that this was a very remarkable thing. One gentleman said it had been a revelation to him, and others say it is very wonderful, and I have been quite struck with the reception which this demonstration has received. Now, I have been wondering why we take that view of it. I do not see anything especially wonderful about it, or anything remarkable, or why it should be such a revelation. It seems to me the most natural thing in the world. Is there anything more wonderful about the facts which Dr. Cryer has shown us than you will find in the investigation of any department of nature? The wonderful thing about the presentment just made is our own ignorance about it. From the exhibit we have had this evening it is apparent to my mind that much of our teaching concerning the anatomy of these parts has been erroneous. We have accepted the results of observations of the ancient anatomists, and have accepted them with reverence, perhaps because of their hoary antiquity; but it seems that we have been all wrong about it, or largely wrong, and here we have a man who has the brains and the clear insight into things to go right to nature for his facts. Why have we not been doing that before, instead of relying upon the dicta of self-constituted authorities? I call attention to this in connection with a remark of Professor Brophy that it would be of great value if there could be duplicates of these pictures had for use in colleges, on account of their great educational importance. He seems to appreciate that. So do I. The demonstration to my mind is an evidence of the great value of going to nature for our facts. This is the great underlying principle of the whole system of technics now being introduced into the schools, a system by which so much has been accomplished, and from which we are expecting much more. This is simply another application of that same idea. It is that

which gives value to what Dr. Cryer has so beautifully demonstrated here this evening.

DR. MCMANUS : I have been very much interested and pleased in listening to this address, because it carries out the idea which I have had for a long time, and which was forced on me a little more thoroughly at the hearing before our legislature, when a physician said that any physician could teach dentists anatomy and physiology. The trouble has been in the past that that is just the way we have been taught. We have been taught anatomy and physiology from the general standpoint of the physician, and only in that way, with slight exceptions. We have evidence to-night of what a practical, educated dentist can do who sets himself about writing up and illustrating any point in dental anatomy. And that is why we are so pleased that we have had to-night a practical, earnest, scientific dentist show these things to us.

DR. CRYER : I have nothing to say in regard to the discussion. Of course I am very much pleased with the remarks which have been made concerning my endeavor to illustrate that which I have been working out. It has been asked if duplicates of these slides could be obtained. I am under obligations to Lea Brothers & Company in the matter. Some time ago Professor Litch asked me if I would write a chapter on anatomy for a new volume of the American System of Dentistry. I said I would, provided they would use new cuts made directly from the subjects. Lea Brothers & Company promised to do so, and these slides have been made from photographs which will be made into half-tones for that work,—partly for that work and partly also for another work which will be shortly published, edited by Dr. Kirk. My specimens were so marked. Of course I think they would wish that book to come out first before they would be willing to have these slides given. I will say this, however, that in a few days,—as soon as I return home and have a little rest,—I shall take my first lessons in photography, in order that I may photograph wet specimens as I get them. Sometimes I get a specimen and it breaks before it is carried to the photographer. Then, too, he does not know exactly what it is that I want photographed. From these photographs I shall make slides, and I shall be only too happy to supply any professor who wishes them for educational purposes.

SECTION VII.—Continued.

A New Method of Closing the Soft Palate.

PAPER BY TRUMAN W. BROPHY, CHAIRMAN OF THE SECTION

THE difficulties attending the closure of the soft palate may be, to a very great extent, overcome by making use of the method which I here illustrate. The delicacy of the tissues and the tendency of the sutures to cut out suggested to me that a modification of the quill suture long ago introduced would aid materially in retaining the sutures and preventing their cutting out after performing the operation of staphylorraphy. Inasmuch as lead is tolerated so well by the tissues, I have employed it for this purpose.

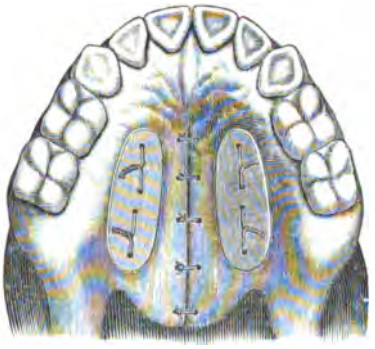
The first drawing (Fig. 1) will show cleft of the soft palate, the

FIG. 1.

fissure extending through the palatal plates of the palate bones and into the palatal plates of the maxillary bones. After the edges of the cleft of the tissues are well freshened, a properly formed needle

curved after the fashion of the gynecologist's needle is employed with which to introduce silk sutures, four of which are carried through the tissues, as shown by the drawing, and these are substituted by rather strong silver sutures; then the lead plates, perforated with holes corresponding to the number of four sutures, shaped so as to extend from the anterior margin of the fissure back to the distal border of the soft palate, are placed upon the palate and bent to conform to its shape. The wire sutures are then passed through the holes, as shown by the drawing, and twisted together. Tension is thereby exerted upon the divided portions of the palate, and their edges are approximated. Should it become necessary, as is often the case, to divide the bones along the border of the hard palate nearest to the molar teeth, this may be done by the use of a strong scalpel or chisel, and then the lead plates are easily brought toward each other together with the tissues that they embrace. In certain cases the elevation of the soft parts, together with the periosteum, may serve our purpose quite as well; this can be accomplished by means of a properly bow-shaped periosteotome. After the edges of the palate have been approximated by the twisting of the wire sutures together, as shown by the drawing (Fig. 2), fine silk sutures

FIG. 2.



may then be employed with which to hold the approximated edges in close contact and secure immediate union.

The advantages claimed for this method of procedure are: 1, The prevention of the cutting out of the sutures, since the lead plates coming in contact with the soft palate exert pressure thereon, and the tension therefore is not made by the suture alone, which exerts pressure on so limited a space, but it is upon the entire length of

the palate covered by the lead plates; 2, The lead plates serve as a splint, rendering the palate inflexible to a very great extent. The vibrations, which are almost constant, are suspended; the active muscles are put out of use until union of the cleft of the tissues may take place.

In conclusion, after using this method of closing the soft palate, I feel confident that better results in a certain number of cases can be secured than by the employment of sutures alone. This is not to take the place of the operation of dividing the bones at the malar process (as described by me in a previous paper*) and carrying the greater portion of the body of the maxillary bones together, but it is adapted to the treatment of patients whose bones are well ossified, and whose deciduous teeth are all erupted. It is in such cases that I commend this operation.

DISCUSSION.

DR. MARSHALL: I want to commend the operation described by Dr. Brophy, because it is one that I have recommended and used for two or three years in my work in the American College of Dental Surgery, and I believe it is one of the best methods of preventing the cutting of stitches that we have.

DR. BROPHY: I have nothing further to say except that I have performed this operation a sufficient number of times to be convinced that it will enable the operator to obtain a greater degree of success in a greater number of cases than by any other method with which I am familiar.

* Transactions of the World's Columbian Dental Congress.

SECTION VII.—Continued.

An Abnormal Case.

PAPER BY H. L. AMBLER, SECRETARY OF THE SECTION.

THE following is the report of the case of a young man aged seventeen years, where both superior lateral incisors are missing, with no outward sign of their being imbedded in the jaw.

The inferior denture has the proper number of teeth, but both of the central incisors are remarkably small, perhaps one-fourth the size they should be; still they are of good form and structure, firmly fixed in the alveolus, and the gingiva indicates well-formed roots about in proportion to the crowns. The young man's father, mother, and grandmother, who are very intelligent people (and have a dentist in the family), state that they are positive that the temporary central incisors were shed and that these two small teeth erupted in their places.

All have talked of the peculiarity many times. Both superior and inferior temporary dentures were normal. His mother needs a left superior lateral incisor to complete her full denture; the father's is complete.

The grandfather and grandmother on both the father's and mother's side had the full number of teeth; the only abnormality we could trace, except the mother's, was that the grandmother retained the left superior temporary cuspid until she was fifty-three years of age, at which time a permanent cuspid of fair form and size erupted, and is still in place after a lapse of twenty-three years.

A model of this case is herewith presented.

SECTION I.

PROSTHETIC DENTISTRY, METALLURGY, AND CHEMISTRY.

The Electric Oven.

PAPER BY L. E. CUSTER, OF THE SECTION.

I HEREWITH submit a report upon my late invention, the electric oven, which, after a year's use, has met my highest expectations. It consists of a flask-shaped oven, whose inner walls are thickly covered with platino-iridium wires, which, when heated by an electric current, radiate their heat directly into the oven cavity. The purity of the heat, the first essential, is assured, since it is not the product of combustion, but is radiated from an electrically heated noble metal. What is known as "gasing" is an impossibility. The ease and accuracy with which the heat can be controlled are also advantages not heretofore attained. If it is desired, any degree of heat up to the melting point of platinum can be obtained. It can be operated by any current used for light or power, upon either the alternating or constant current, and equally as well upon the 52 as upon the 500 volt current. Unlike most electrical instruments, this one as I have constructed it can be readily converted from one voltage to another in case the operator changes his current.

A great advantage found in the electric oven is the ease with which the different degrees of heat are distinguished. Instead of one large opening, as in old forms, I have found it better to have two small openings placed at such an angle that a ray of light entering one is reflected out by the porcelain through the other, so that the eye is not blinded by the surrounding heat and light, but is able to distinctly see the whole palatine surface of the plate and clearly dis-

tinguish each step in the fusing process. One who has never seen porcelain fuse before finds no difficulty in distinguishing the different degrees of fusion by this arrangement.

If it is desired to operate mechanically, the field is open with the electric oven for any variety of appliances for this purpose. I have up to this time devised: 1. A time appliance, whereby the current may be gradually turned on and cut off at the proper time. 2. An electric appliance which operates upon the fusing of a button of the same porcelain as that under treatment, which is placed in the oven at the time. 3. An instrument, the swing of whose arm is in proportion to the heat of the oven; and 4, an electric thermometer whereby the heat may be measured by the rise of mercury in the tube.

Another advantage found in the electric oven is in the fact that it is not necessary to remove the case from the oven till it is entirely cold. The operator who has been accustomed to the complicated process of annealing ovens, etc., cannot at once realize that it can be so simple a thing as placing the case in position, touching the button, and the work is done. I repeat that it is not necessary to warm up the case before putting it in the oven, much less is it necessary to remove till entirely cold. When the case is ready it is placed in the cold oven, the heat is gradually turned on till in thirty minutes, or less time if you like, the porcelain fuses. When it is fused the operation is done. The current is turned off, and at that very instant the oven begins to cool, so that it is impossible to overfuse or bleach the gum color. I state, upon the report of those experienced porcelain workers who are now using the electric oven, that porcelain treated in this appliance possesses improved qualities; the body appears stronger and the gum color more brilliant.

It is difficult also for some to comprehend the fact that muffles are not necessary. It has heretofore been customary for the operator to bunch his porcelain work together, so that he can fuse as much as possible at one heat of his oven; but at the end of the day, allowing half an hour for the first baking to cool and two hours for the subsequent ones, with the electric oven he can make from five to six fuses.

The ease with which the oven can be repaired in case of a "burn-out" from ignorance or carelessness overcomes the objections so often offered against electric instruments. In such an event it always burns out at the weakest point, and the moment the wire fuses the current is cut off by this break in the wire and the heat goes down. It is

the work of but a few minutes to twist in and solder a piece of new wire across the break, cover with new clay, and proceed.

The cost of operating is of interest. At the rates which we pay for light it costs about one cent per fuse of thirty minutes, and at power rates but half that. The low cost as compared with other methods is explained by the fact that the heat generated is used without waste. It is generated within the oven cavity itself, and not from without. The oven may almost be held in the hand while fusing.

The only objection offered to the electric oven is made by Dr. Meyer, who states that it will not fuse thick portions as well as thin. However much we respect Dr. Meyer for his attainments in porcelain work, we must differ from him in this statement. It is only theoretical on his part, because he has not used the appliance. Of all the ovens or furnaces yet devised the electric oven more nearly meets this very objection, because, as the heat is radiated from all directions, from the top, bottom, and sides as well, the case placed in the center receives its heat equally from all directions ; so that in the course of thirty minutes it is reasonable to suppose that the thicker portions are quite as hot as the thinner. Especially is this so when we consider that before the porcelain is fused it is in the form of a powder and is not solid, so that it is heated all alike, through and through, and drops into a fuse at the same time. This process as described can be observed in the electric oven as it cannot in others.

A summary of the advantages of the electric oven is as follows: It makes no noise or dirt, and does not heat up the room ; requires no attention until the fusing point is reached ; it is compact and may be placed in the operating room ; the heat is without gas or odor. Any degree of heat up to the melting-point of platinum can be obtained. By means of the rheostat the heat may be varied at will or it may be held at one point indefinitely. By the arrangement of two sight openings the eye is not blinded by the heat, and being but a few inches from the melting porcelain sees clearly the fusing as it progresses. Upon turning the current off the case immediately begins to cool, which makes an over-fuse impossible and at the same time secures the brilliancy of the gum color. The porcelain, both body and gum, seems to improve in the electric oven. The instrument consumes so little current that it is not only cheap in operation, but can be connected to any electric fixture of the building without separate wiring. In short, it is not claiming too much to say that the electric oven is the ideal the porcelain worker has long sought.

SECTION I.—Continued.

Some Principles of Bridge-Work.

PAPER BY HENRY H. BURCHARD, OF THE SECTION.

IN the entire range of dental practice there is probably no subject in which, or regarding which, there is a greater diversity of individual opinion than in the domain of bridge-work. There are all shades and degrees of advocacy, ranging from reluctant acceptance of some of the simplest forms to an indorsement of the type known as wing or extension bridges.

An examination of much of the literature of this subject will show that the methods and appliances are many, but evidence of a recognition of the principles of action of many of them is lacking. There arises from this a degree of inharmony confusing to students and novices, and which has its effect upon older practitioners, for not infrequently experiments are by the latter deemed warranted which would probably be condemned by a court of competent judges.

This special work has been practiced for sufficient time to warrant the deduction of some guiding principles; as an attempt at formulation is the avowed purpose of this essay, it will deal with some matters with which all of us are already familiar. No new designs will be advanced or even suggested. The paper merely represents an attempt to deduce from our present knowledge definite rules which may be acceptable and serviceable to teachers. For the purpose of inviting your searching criticism, the rules are formulated. The writer believes that if rules such as these, or modifications of them, be accepted as sound principles, they will serve at least in some measure as a check to that great abuse, injudicious bridge-work.

Before entering upon the essay proper, it is well to recognize that

there is a political economy of bridge-work; that appliances may have a comparative value varying according to the purse of the wearer. That is, appliances which are undeniably of faulty design may, under exceptional circumstances, be used with propriety. What might be a wise and prudent expenditure on the part of a man of wealth would be to one of limited means an unjustifiable outlay. To the former, the deferring of wearing a plate for even a short period is sufficient gain to warrant an expense which, to the second, would be a wild extravagance. So that, as regards principles, some special cases may be excluded; for those appliances which are professedly or confessedly designed for temporary use belong in a class by themselves. The varieties considered here are those designed for permanency.

As preliminary principles are advanced these two statements:

First, no one is justified in practicing bridge-work unless he possesses an exhaustive knowledge of the surgical aspect of dentistry combined with the skill of a finished mechanician.

Second, Is a bridge demanded by the conditions present? and not, Is it possible to apply one?

There are two aspects of this variety of work, one mechanical, the other physiological. Under the first head are included the laboratory art of the prosthetist, together with all considerations of mechanical resistance to stress, and the effects of force and stress as expressed in movement of the abutments, the bridge, or any part of it. It is assumed that the laboratory operations shall be done as they should be; so that interest will center in the mechanics of the finished piece.

Each tooth of a denture is by its anatomical form and position, its structure and support, designed to sustain, to resist a force in a certain direction or directions, this latter depending upon the class of tooth. Force in excess of the normal amount is a menace to a tooth's integrity, its retention. By connecting two or more teeth, as is done with the abutments of a bridge, their original mobility is modified. It may be that such fixation produces an increased resistance over the amount possessed by each tooth acting separately, but in the vast majority of cases any increase derived through this means is outweighed by the lateral stress received by and through the body of the bridge and transmitted to the abutments. The commonest of all mechanical faults is an undue strain, insufficient regard being paid to the resistance available. It is unsafe to advance fixed rules as to the amount of stress any tooth can withstand; for this is governed

by the anatomical form of the tooth, its physiological condition, and that of surrounding parts. For example, let there be two central incisor roots of the same size, and having supporting structures alike. It is evident that if artificial crowns be placed on these roots, the one having the greater amount of incisive surface will be subjected to the greater strain ; that is, the longer the crown or the greater the overbite, the greater will be the force received.

Obviously, the root sustaining the greater amount of stress would suffer in that ratio from an increase of force received. Of two roots of the same size, and when crowned having similar occlusions, one possesses a pericementum which has never been the seat of disease ; the other has been affected by chronic apical abscess, but is now cured. Certainly the root which will bear safely the greater stress is that which has never been the seat of morbid action. This point is dwelt upon because of the frequent non-recognition in the practice of bridge-work of an accepted principle of general surgery, "that a part once inflamed has an increased liability to disease in the future."

Recognizing bridge-work as a variety of mechanism, the construction of which is based upon engineering principles, it should be so made as to accord with those principles. It should be viewed as a bridge, as a continuous surface supported by fixation at two or more points, designed to bear safely a calculated amount of strain.

An examination of some of the devices designated dental bridges will show that the forces applied, and resistances furnished, offer numerous instances of violations of the simplest engineering principles. Pieces are placed, and in many cases by those known as experts, with but little apparent regard of the forces received, or the nature and direction of the strains tending to dislodge the appliance. Some of the most serious of faults are in this direction.

An example of this may be found in what are known as extension bridges. The root of a central incisor bears a replacing crown, and having as lateral attachment to this another central crown depending solely for its support upon the first. Clearly with such a device, in addition to the direct outward strain of normal occlusion, the supporting root must sustain the force of the incisive action bearing upon the wing crown, and as this operates it has the effect of a lever producing rotation, which rotation, if the crown be firmly attached, must be of the root itself.

In immediate connection with this rotating effect is the principle of bar anchorage. Frequently this variety of anchorage is made

with round or prismatic pins. It is evident that with round pins the force of incisive action (if the crown be anterior) will tend to rotate the crown as though it were swung on trunnions. With the prismatic pins, the slight difference in the direction of the forces received by the supporting teeth will tend to separate them, and thus draw them away from the artificial crown, and strip the fillings from the pins as a glove from the fingers. With a crown having double pins (the Bing crown) there is the same tendency to stripping if the pins are left parallel.

It becomes evident from this that the correct form for these pins is pyramidal, the bases of the pyramids being anchored in the retaining fillings.

When properly shaped pins are employed and firmly anchored by retaining fillings, these fillings become virtually part of the bridge, and every strain to which this is subjected reacts upon the teeth through the cavity walls. It may be that mine is an exceptional experience, but I cannot recall having seen any bridge which had bar anchorage in a tooth with a living pulp, which was not faulty in itself, the bar becoming loosened or the filling loosening from the cavity walls. The only results I have seen following the resting of a metal spur support upon a tooth have been either bending of this spur, or, when rigid enough to withstand the strain, decalcification of the underlying enamel; and when resting on the gum a localized gingivitis and beginning pyorrhea at that point.

The amount of masticating surface of a bridge should be varied according to the number, position, and strength of the abutment teeth; that is, bridges which have relatively weak support either of number or condition of the abutments should have the masticating area lessened in correspondence.

The application of this principle may be found in such cases as these:

A bridge which has as abutments a cuspid and a third molar is frequently given the same extent of masticating surface as was present with the natural teeth.

In this connection Dr. Bonwill once criticised a piece of bridgework as being a beautiful specimen of workmanship and a miserable failure from the utilitarian point of view, for the dummy crowns were short of occlusion. Applying the principle of his articulator to the articulation of dummy teeth would produce in the bridge the same extent and form of occlusion present originally with the natural teeth.

The cusps would have a graded length, and in the lateral movement of the jaw would have an increased contact and an increased lateral stress, this latter governed by the length of the cusps. The strain is brought to a safer limit by shortening the cusps, so that, while at rest the occlusion of the bridge and its antagonists is perfect, the cusps are shortened sufficiently to obviate this difficulty. To attain the result desired by Bonwill would increase the usefulness of the piece while it remained, but would inevitably hasten its loss.

In a common form of bridge,—cuspid roots supporting the six front teeth,—its retention is threatened by the leverage represented in the overbite, the extent of incisive surface; this latter depending upon the point at which occlusion of the posterior teeth checks the action of the incisors. So that the longer the incisors the greater is the leverage or stress, and in the ratio of these forces there is an increasing demand for supplementary support of the bicuspids.

The next formulation is: To insure the stability of a fixed bridge, it should be so constructed and attached that neither bridge nor any part of it has any movement independent of that of the abutments.

The term fixed bridge is used in recognition of Dr. M. L. Rhein's essay on removable and movable bridges, entitled, "Ideal Bridge-Work," *Dental Cosmos*, vol. xxxvi, p. 97.

The application of this principle may be illustrated through one of its violations in the cases which have partial caps over cuspid crowns, with a thin, narrow band covering the labio-cervical aspect of the crown. In the majority of instances it will be found that this segment of metal is too frail. When thin enough to slip readily into position and to fit properly, it is not sufficiently rigid to prevent a slight movement of the encircled tooth independent of the movement of the body of the bridge during mastication. This movement dislodges the underlying cement, which is lost, and the space remaining is soon filled with fermenting débris.

The same effect may be seen with bicuspid and molar crowns when the metal of which they are made is too thin or when unstiffened by solder; or when the body of the bridge has not extensive enough attachment to the crowns for the abutment teeth; displacement or distortion of these crowns results, and they fret away the retaining cement piecemeal.

Assuming a bridge to be mechanically correct, there is now the consideration of the physiological aspect.

This includes a survey of all the vital relations, the question of the

physiological resistance of the abutments, and the danger, immediate or remote, of any degree or type of disease process of any of the parts covered by the bridge; the present state of the enamel, dentine, and pulp, of the pericementum, the contiguous mucous membrane, and the underlying process; after this the consideration of conditions following the placement of the bridge, the possibility of disease of any of these tissues. The possibility or probability of enamel decalcification, caries, or eburnitis, any grade or variety of pulpitis or pericementitis, of gingivitis or stomatitis, must be a strong governing factor in determining the form of bridge to be used.

An engineer knows that the permanence and stability of a bridge depend primarily upon the strength of the abutments. If these be badly built or poorly sustained the bridge fails, so they are constructed with a due regard to the resistance they are to afford, the stress they are to bear. Using as abutments any but sound teeth or roots, those free from any grade or form of pericementitis, is equivalent to an engineer building foundations in a marsh without piling.

An exception might be made to this rule under one condition; that is, where a bridge acting as a splint adds support to rather than imposes a strain upon the tooth affected. This is an extreme exception, a remote contingency. One of the evils of poor bridge-work—this admits too much, for poor bridge-work is an unmixed evil, a great evil—is the old and well-founded objection of uncleanliness. This principle is proposed relative to this matter:

Crowns and bridges should be so made and applied that no more opportunity is given for the action of ferments than when the natural teeth were in position.

Secondly, any part of a tooth's surface which through the placing of a bridge is put beyond the action of the ordinary cleansing agents used by the patient, should be protected from the ingress and contact of ferments and fermentable material.

Perhaps the most common cause of the origin of a disease process due to the presence of a bridge will be found in pockets in which fermenting material is held in contact with the enamel. This arises from surfaces being imperfectly protected; bands are too narrow or too short, or badly fitted, or bar anchorages are defective. Therefore every part of a tooth's surface which forms a wall to a pocket should be covered by metal, either as a segment of a crown or as a part of a retaining filling.

This excludes from the category of correct appliances devices

which have bars or pieces resting on but unattached to natural teeth, for inevitably between bars and teeth fermenting material must accumulate. By the same rule, with bar anchorages, the margins of the retaining filling should be finished with the same care and thoroughness as though these fillings were designed to prevent and remedy the ravages of caries. Moreover, the margins should be always accessible to the action of cleansing agents, or there is an increased probability of caries in such situations. To fulfill this requirement almost *necessitates* that the lower and one lateral margin be covered by filling-material and the edges finished before the bar anchorage is placed.

There are cases where, from improper or crude finishing, inequalities are left which become a source of irritation, it may be inflammation of the soft tissues with which they are in contact. This rule is suggested:

Contact of any part of a bridge with tissues should be of such nature that no source of irritation is produced, either through roughness, undue pressure, or the formation of spaces in which decomposing substances may find lodgment.

I have recently demonstrated that phosphate of zinc is destroyed by the action of lactic acid. It is not a perfect solution, but a gradual surface disintegration, so that to insure the integrity of this material it must be kept from contact with the acid. Hence this rule: The cement used as a retaining agent should be placed as nearly as possible beyond access of the fluids of the mouth.

The conclusion is a reiteration of one of the first principles: Is a bridge demanded by the conditions present? and not, Is it possible to apply one? It is the opinion of many, very many, and of which number I am one, that many patients for whom bridge-work is inserted would be better served, and a greater regard for hygienic conditions evinced, had a partial plate been used and not a bridge.

The abuse of this variety of work in the practice of reputable dentists is but trifling as compared with its gross misapplication at the hands of the charlatan,—for I have seen cases for which appliances have been made by these gentry which would form a good basis for an action for personal damages, as glaring malpractices as it is possible to conceive.

IN accordance with the recommendation of the Special Committee on the President's Address (see page 43), the addresses of Drs. Fillebrown and Garretson, delivered at the celebration of the Semi-Centennial of Modern Anesthesia, are herewith presented.

History of the Discovery of Modern Anesthesia.

Address delivered before the Meeting Commemorative of the Semi-Centennial of the Discovery of Modern Anesthesia, at Philadelphia, December 11, 1894, by Thomas Fillebrown.

To-day we'll
"Poise the cause of Justice in equal scales,
Whose beam stands sure, whose rightful cause prevails."
And
"If circumstances lead me, I will find
Where truth is hid, though it were hid indeed
Within the center."

[Shakespeare.]

FIFTY years ago to-day there was enacted in the city of Hartford, Conn., the first scene in the development of the grandest and most beneficent discovery the world has ever beheld, the Discovery of Modern Anesthesia; and this during a period which has exceeded all others in the magnitude and importance of the discoveries made in science, mechanics, and medicine.

We wish to pay our tribute to the memory of the discoverer of this great fact. To this end let us examine the testimony, restate the facts, and again judge their relative value.

"We can do nothing against the truth." History makes itself; to record it impartially is a difficult task.

Great discoveries and great events do not burst forth with Promethean suddenness or completeness, but are the result of long periods of incubation and growth, and oftentimes await many long years of expectancy, hope, and even despair. Such was the case with the great fact of practical anesthesia. The ancient nations waited for it, hunted for it, but died without the sight. Modern nations continued the longing search, but they caught only a glimpse of the coming

day to reward them, until the middle of the present century, when Horace Wells discovered, demonstrated, and proclaimed the great blessing, "which stopped pain, robbed the knife of its terrors," and made glad the heart of every sympathizer with suffering.

Insensibility to surgical operations was occasionally induced many centuries ago. Homer mentions the anesthetic effect of nepenthe, and refers to the inhalation of a vapor of hemp. Dioscorides and Pliny record the use of mandragora. Apuleius, A.D. 125, said, "If a man has to have a limb mutilated, sawn, or burnt, he may take an ounce of mandragora wine, and whilst he sleeps the member may be cut off without pain or sense." In the third century Hoatho, a Chinese, gave his patients a preparation of hemp which rendered them insensible to pain. Theodoric in the thirteenth century gave directions for preparing the spongia somnifera for inhalation before operations.

Ether was known as early as the thirteenth century, and described by Cordus in the sixteenth century, and the name ether was given it by Frobenius in 1730. In 1828 Gérardin read a paper before the Academy of Medicine of Paris describing surgical anesthesia produced by inhaling gases.

In 1800 Sir Humphry Davy made his remarkable statement that "As nitrous oxid gas appears capable of destroying physical pain, it may probably be used to advantage during surgical operations in which no great effusion of blood takes place." The pity is that this suggestion should have lain buried under the forgetfulness of forty-five years and borne no fruit.

None of the agents used by the ancients proved practical or safe; consequently at the beginning of the present century practical anesthesia remained undiscovered.

Two agents are inseparably connected with the discovery of modern anesthesia, protoxid of nitrogen and sulfuric ether. Protoxid of nitrogen was discovered by Priestley, described by Davy, and practically applied by Horace Wells in 1844.

Sulfuric ether was discovered in the thirteenth century, described in the sixteenth, named in the eighteenth, and practically applied to produce surgical anesthesia in the nineteenth century, when, in 1846, its use was made known to the world by Morton at the Massachusetts General Hospital.

Ever since 1818 the physiological action of these drugs has been well understood. In 1840 it was well known that both would pro-

duce intoxication, and that both would lessen the severity of pain, having been repeatedly inhaled for amusement and for relief of suffering. So it was but a step from this to the attainment of surgical success; but a step no one had dared take and maintain until Wells ventured and bridged the chasm. The history of this step is simple but dramatic. It is known that Wells possessed the current knowledge concerning the properties and physiological effects of both gas and ether, though probably ignorant of Davy's suggestion. For four years he had believed it possible, by the inhalation of certain gases, especially laughing gas, to produce a degree of intoxication that would obtund the pain of surgical operations.

At this time G. Q. Colton was delivering throughout the country popular lectures on chemistry; administering at each lecture the laughing gas for the amusement of the audience. December 10, 1844, he lectured in Hartford, Conn. In the audience was Horace Wells, with his mind still occupied with the possibilities of the gas. He inhaled the gas himself; he watched its effects on others. He said to a Mr. Clark, "I believe a man may, by taking that gas, have a tooth extracted or a limb amputated, and not feel any pain." Among those present was Mr. S. A. Cooley, a druggist. Mr. Cooley inhaled the gas, and while under its influence ran against and overthrew some benches in the hall, thereby producing several severe abrasions upon his knees. When he recovered consciousness he found the skin on his limbs badly bruised and broken, and yet he had not suffered at all, and did not know of the injury he had inflicted upon himself until the spectators had called his attention to it. Dr. Wells observed this effect of the gas, and at once determined to try it on his own person. A troublesome wisdom-tooth offered the necessary object for the experiment. A number of those present, including Colton, Wells, and Cooley, met on the morning of the 11th of December at Dr. Wells's office. What occurred there is thus described by Dr. Riggs, whose office adjoined Dr. Wells's, and who was called in to extract the tooth:

"Dr. Wells a few minutes after I went in, and after conversation, took a seat in the operating chair. I examined the tooth to be extracted with a glass, as I generally do. Wells took the bag of gas from Mr. Colton and sat with it in his lap, and I stood by his side; Wells then breathed the gas until he was affected by it; his head dropped back. I put my hand to his chin, he opened his mouth, and I extracted the tooth; his mouth remained opened some time.

I held up the tooth in the instrument that the others might see it, they standing partially back of the screen and looking on.

"Dr. Wells soon recovered from the influence of the gas so as to know what he was about, discharged the blood from his mouth, swung his hand and said, 'A new era in tooth-pulling; it did not hurt me at all.'

"We were all much elated, and conversed about it for an hour after. We were so elated by the success of this experiment that we immediately turned our attention to the extraction of teeth by means of this agent, and continued to devote ourselves to this subject for several weeks, almost exclusively. Dr. Wells continued to use the gas freely in the practice of dentistry during the remainder of that year and the year following, and at all times when he was in the practice of his profession."

Then was the deduction and suggestion made by Humphry Davy in 1800 verified by Horace Wells; the prophecy fulfilled; and practical anesthesia became a discovered and demonstrated reality.

This event was the source of the world's knowledge of anesthesia; all previous efforts had come to naught; but the echoes of Wells's success were soon heard around the world.

In the beginning of the present century science could not interpret the signs, and Davy's conception and prophecy of the possibilities of nitrous oxid fell upon deaf ears, and all the knowledge concerning the power of ether to produce insensibility to pain appealed to sterile minds. And even in 1844 the professional ear was not quite attuned to the sound, and could not recognize in the extraction of Dr. Wells's tooth, on the 11th of December, 1844, the key to the solution of the whole problem of anesthesia. Even those most interested, most acute, and most observant, could not in Wells's nearly successful operation before the class of the Harvard Medical School in January, 1845, apprehend the great fact that surgical anesthesia was a possibility. Nor indeed could they perceive it until it was forced upon their attention by the courage of a Morton.

If, when Wells extracted the student's tooth, the surgeons of the Massachusetts General Hospital had possessed a little more of that keen perceptive power "of feeling, than of seeing; of the heart than of the ear," they would have apprehended the possibilities; and the discovery of surgical anesthesia would then have been acknowledged, the processes perfected, and no disputing claims would have arisen.

When we realize how hard it is to compel attention to a new idea,

how slow is the accumulation of new facts, how gradual the growth of perception, and how great the magnitude of this subject, we cease to wonder at the slowness with which the significance of this event was appreciated.

In future years whenever and wherever the discovery of anesthesia is intelligently discussed with knowledge of the subject, the name of Horace Wells will be spoken with honor and gratitude, and with his name will be associated the names of John M. Riggs, G. Q. Colton, E. E. Marcy, W. T. G. Morton, James Y. Simpson, Charles F. Jackson, Oliver Wendell Holmes, and Henry J. Bigelow.

Of these Dr. Marcy and G. Q. Colton still survive to bear witness to their part in the drama and enjoy their honors.

G. Q. Colton administered the nitrous oxid gas to Dr. Wells for the first operation under anesthesia, and reintroduced its use in 1863.

Dr. Riggs performed the first operation, extracting Wells's molar tooth.

Dr. Marcy suggested to Dr. Wells the use of ether instead of gas, and verified its action.

Dr. Morton made the first public application of ether for surgical anesthesia.

Dr. Jackson claimed to have suggested all that Morton knew about the effects of ether, and the use of it for anesthetic purposes.

Dr. Simpson made himself and British surgery famous by the discovery of the anesthetic power of chloroform.

Dr. Holmes suggested for this condition of insensibility the name, the use of which has become universal. He wrote to Dr. Morton as follows:

"Everybody wants to have a hand in a great invention. All I will do is to give you a hint or two as to names, or the name, to be applied to the state produced and to the agent.

"The state should, I think, be called anesthesia. This signifies insensibility, more particularly (as used by Linnæus and Cullen) to objects of touch. The adjective will be anesthetic. Thus we might say, the 'state of anesthesia,' or the 'anesthetic state.' The means employed would be properly called the 'anti-esthetic agent.' Perhaps it might be allowable to say 'anesthetic agent;' but this admits of question.

"The words anti-neuric, aneuric, neuro-leptic, seem too anatomical; whereas the change is a physiological one. I throw these out for consideration.

"I would have a name pretty soon, and consult some accomplished scholar, such as President Everett, or Dr. Bigelow, Sr., before fixing upon the terms which will be repeated by the tongues of every civilized race of mankind. You could mention these words which I suggest, for their consideration; but there may be others more appropriate and agreeable. Yours respectfully,

"O. W. HOLMES."

Dr. Crawford W. Long, of Georgia, used ether for anesthetic purposes three times during 1842–43, and now appears as a claimant to the discovery. But Dr. Long's connection with the subject was not mentioned until many years after the fact. He did not write a word in regard to his discovery, nor did any notice of it appear in print until 1849, five years after Wells's discovery, and seven years after he himself had administered the ether. How could any one after knowing of such a boon to suffering humanity, resist for even a day the impulse to "fly on joyful wings, cleaving the sky," to proclaim the coming of this great consolation to the afflicted?

Dr. R. M. Hodges wrote of this claim: "Not a physician or surgeon ever used ether because Long had used it; nor did mankind learn from him that anesthetic inhalation for surgical purposes was possible. His claim was made after the fact, and resting on no better foundation than those claims similarly made by other aspirants for distinction; a class so numerous as to have been named by the *London Lancet*, 'The class of jump-up-behinders.'"

Dr. H. J. Bigelow's connection with the ether discovery was important, perhaps vital to the success of anesthesia at that time, as in more than one instance he prevented fatal results from over-anesthesia. Although but twenty-eight years of age, and junior surgeon at the hospital, less than one year in office, he was the one whose penetration, executive ability, sagacious and active qualities of mind and body, made him realize that the event of a lifetime was taking place. He made a clinical study of the subject; he made most unremitting exertion to prove the safety of ether; he practically supervised etherization during the first year of its use. He announced to the world the discovery of this use of ether, in a paper read at the American Academy of Medicine, November 3, 1846. He verified the anesthetic power of nitrous oxid in 1848. These facts have identified Dr. Bigelow with the whole subject of anesthesia. Had he been present on the occasion of Wells's first experiment, it is not unlikely the course of events would have been materially different.

Dr. Edward Warren wrote, "To him next to the discoverer himself are the public and the world indebted for the blessings of so early receiving this great discovery."

The many volumes printed during the exciting years from 1846 to 1863 furnish a great number of statements, opinions, and facts pertaining to this discovery, most of which have ceased to be of any value.

Napoleon is said to have often let his letters lie unopened for several days, giving as a reason, that in that time events would answer a greater part of them. So we find that the larger part of the statements, opinions, and arguments in regard to this subject have been answered by subsequent events.

Let us contrast a few of the statements made at that time with the facts as now known.

Then some denied that nitrous oxid was an anesthetic; *to-day* it is known as one of the most efficient.

In *1844*, Wells claimed that the gas was safer than ether; others denied its safety; *to-day* it stands proven the safest and most pleasant anesthetic agent known to the world.

It was *then* claimed to be impracticable to use it; *now* its successful administration annually to more patients than all other agents combined proves its practicability.

It was *then* claimed to be inefficient for prolonged operations; *to-day* it is proven equal to continuing the anesthetic state indefinitely.

Then it was contended by skillful surgeons and eminent divines, "that pain was a natural protection, a necessary stimulant to the reparative process, and a Providential dispensation, and that the prevention of it was defying the Almighty;" *now* it amounts to inhumanity and malpractice to presume to do any severe operation without it.

Prof. Charles D. Meigs, of the Jefferson Medical College of Philadelphia, as late as 1856, wrote of the "doubtful nature of any processes that the physician sets up to contravene the operation of those natural and physiological forces that the Divinity has ordained us to enjoy or suffer."

And a clergyman wrote to a medical friend as follows: "Anesthesia is a decoy of Satan apparently offering itself to bless women; but in the end it will harden society, and rob God of the deep, earnest cries which arise in time of trouble for help."

The following facts seem to be established by indisputable sworn testimony, and I believe are admitted by all the friends of truth.

In 1840 Dr. Wells expressed his faith in the anesthetic power of nitrous oxid.

December 11, 1844, Wells inhaled nitrous oxid and had a tooth extracted painlessly, which event immediately became known throughout the city of Hartford and vicinity.

Forthwith Wells made a pilgrimage to Boston to proclaim and demonstrate his discovery; he called on Morton and made known to him this event. Through Morton's intercession an invitation was given Dr. Wells by Dr. J. C. Warren, to speak to the class of the Harvard Medical School, and describe his discovery. A little later he gave the nitrous oxid to a patient and extracted a tooth for him before the same class with incomplete success. The patient cried out as with pain, but when again conscious declared he had not been hurt.

A month later Dr. Marcy suggested to Wells the use of sulfuric ether for this same purpose, and verified its effects by anesthetizing a patient with this agent, and removing a good-sized tumor from his head without causing pain. They both discarded ether, as its odor was unpleasant, and because they considered it less safe than laughing gas.

Early in 1845 Dr. Wells administered sulfuric ether to a patient (Gaylord Wells) and extracted a tooth painlessly.

In 1841 Dr. Morton was a pupil of Dr. Wells. In 1842 they were in business together for a time in Boston.

In July, 1845, Morton called on Wells in Hartford and talked with him and Dr. Riggs about the gas, and asked them for a supply.

Dr. Wells referred him to Dr. Jackson for information as to the manufacture of it.

Drs. Wells, Riggs, and others continued the use of gas until November 6, 1846, when chloroform and ether were substituted, and gas remained unused until 1863.

The use of nitrous oxid for anesthetic purposes was recorded in the *Boston Medical and Surgical Journal* of June 18, 1845, as follows: "The nitrous oxid gas has been used in quite a number of cases by our [Hartford] dentists during the extraction of teeth, and has been proven by its excitement perfectly to destroy pain."

Dr. Wm. T. G. Morton performed his first successful operation with ether Sept. 30, 1846; and on Oct. 16, following, he administered ether to a patient at the Massachusetts General Hospital, and on the 17th to a second case.

About Oct. 20, 1846, Dr. Jackson claimed compensation from Morton for professional advice, and charged five hundred dollars.

Oct. 27, 1846, Drs. Morton and Jackson made oath to a joint discovery of a *compound* for the prevention of pain during surgical operations; and applied for a patent. The patent was granted, and in 1863 was declared void, as such a discovery was not patentable.

November 9, 1846, Dr. Morton declared it was simply sulfuric ether, not a compound as claimed in his application for a patent.

In the autumn of 1847 Drs. Jackson and Morton each claimed to be the sole independent discoverer of anesthesia, and in no wise indebted to the other, and so contended to the end.

In 1847, the Paris Academy of Medicine upon *ex parte* evidence declared Morton and Jackson the discoverers of anesthesia.

In January, 1848, the Parisian Medical Society, after a full hearing of evidence from both parties, voted that "To Horace Wells, of Hartford, Conn., U. S. A.; is due all the honor of having discovered and successfully applied the uses of vapors or gases whereby surgical operations could be performed without pain," and elected him an honorary member of the society.

In 1846 the surgeons of the Massachusetts General Hospital gave Morton the credit of being the discoverer of modern anesthesia. In 1853, five years after Wells's death, Dr. C. H. Haywood, one of the surgeons present at the first operation, gave the following unqualified credit to Wells for his share in it. He closes a letter to Hon. Truman Smith with these words:

"It was no Minerva born full armored. Moreover, in analyzing the nature of the discovery, we can detect several elements which were successfully brought to light. Thus we observe in the first period an indefinite search after some method of producing insensibility to pain. Then came a second period where great advance was made, beyond all dispute, due to Horace Wells.

"This was the first important step in the history of anesthesia.

"The question of priority may be easily settled. It is satisfactorily proved that Dr. Wells's experiments had established the above mentioned points as early as 1844, though they had not determined either the best agent, or perfected the method of administration in detail.

"In the third period the anesthetic properties of certain substances were discovered. First nitrous oxid was tried; then sulfuric ether; then chloroform; then chloric ether. These discoveries were all made by different individuals.

"Now for which of these agents and to which discoverer shall remuneration be granted? To each and for all I say: to Morton for sulfuric ether, to Dr. Simpson for chloroform, to Dr. J. C. Warren for chloric ether; but before all, let full and ample justice be done to that noble genius which first conceived the grand idea which has been the basis of all the experiments, and father of all the discoveries. To the spirit of Horace Wells belongs the honor of having given to suffering humanity the greatest boon it ever received from science."

"Thus do facts maintain the majesty of truth." Argument would only weaken the evident conclusion.

Considering that Wells was timid, retiring, and only twenty-seven years old when he announced his discovery, who can wonder that he should return from Boston disheartened; and later, when still suffering from disappointment and the ill-effects of his own sacrificing experiments, meet a sad and tragic death?

It is remarkable, too, that his rival claimants should both meet an almost equally tragic fate: Morton dying of apoplexy while out riding, and Jackson spending the last seven years of his life in an asylum for the insane.

Thus did "the shears of Fate cut the tent-ropes of their lives."

Upon the memory of Horace Wells there remains no blot or stain; against him no charge of selfishness, dishonesty, deceit, or unfairness was ever made; he lived and died honored and respected by the people among whom he dwelt. We best quote the words of one who knew him intimately:

"He had a mind of uncommon restlessness, activity, and intelligence. He early manifested great inventive genius and mechanical talent. He was of medium height, with a head of remarkable size, complexion light, compactly built, of pleasing countenance and address, and of fine personal appearance. As a citizen he was a man of great purity of character and of generous impulses, honoring religion by his walk and conversation; as a son he was kind and dutiful; and in his family relations an example of kindness and affection. In all these respects he was without spot."

Such a character as this sought only the legitimate emoluments of his calling, and was always ready to benefit his profession and mankind. No sacrifice was too great for him to make. Very appreciative of words of encouragement, he was also very sensitive to criticism; hence it is not strange that such a spirit, so young, should quail before the derision of professors and jeers of students. Honest himself,

he could not think others dishonest; just, he could not brook injustice. Being denied what he knew were his just claims, his soul was cut to the quick, and a dark veil was drawn over what promised a brilliant and useful life.

We lay our wreath upon his tomb; would that we to-day might with it crown his head. Coming generations will recognize in him the martyr and the world's benefactor; and on every monument which in the future may be raised to commemorate this great event, will be inscribed: "Horace Wells—the Discoverer of Modern Anesthesia."

The Application of Anesthesia to Surgery, and its Benefits to Mankind.

Address delivered before the Meeting Commemorative of the Semi-Centennial of the Discovery of Modern Anesthesia, at Philadelphia, December 11, 1894, by James E. Garretson.

I COME to assure this great audience that I stand in its presence overwhelmed by the contrast that separates subject and speaker; and that I find words in deference only to the circumstances of the occasion which brings us together.

It is no profane comparison to suggest that naught but a sense of profanation could associate with a priest who should add words to the lifting of the Host. Does not a priest, in performance of this act, set a seal upon his lips? Does he not wrap in vestment that has been blessed, the hands which are to touch the sacred symbol?

The profundity of the meaning, not to say the holiness, of what seems to me among the greatest of God's gifts to men, Anesthesia, affects me, in its contemplation, as I assume the priest to be affected as he approaches the Host. The full feeling is, "Be still!"

Silence! and its golden meaning!

Surely,—forcing ourselves to talk and listen,—the gold of Anesthesia is silence; silence in place of agonizing, heart-rending screams. Silence in place of cries from the pitying, but helpless, bystanders. Silence in presence of torture shorn of its terror.

On an occasion, now many years back, I was wandering through the lanes and alleys of Sleepy Hollow Cemetery in the town of Concord, Massachusetts, when, being led up a hill, I stepped over a low, much-abused hedge of arbor vitæ, discovering a plain low-set stone having upon its face a single word. When at the foot of the hill, I had found myself surrounded by what would not inaptly bear description as splendid marbles. Upon these were deeply cut many names

and the records of many virtues. Neither names nor virtues had, however, significance to me. No chord was struck, no response elicited. The word upon the low-set stone of the hilltop was, Hawthorne. The ring of a bell is its metal. The name of a man is his work. Men who have done something: either as cause or instrument! What reverberations ring out as such names are encountered! Somewhere, everywhere, is a sound. The lives of great men; the memories of the lives of great men;—left to remind us.

Horace Wells! The name does not, nor will not, still. It rings, and rings, and rings, in distinctness, albeit accordant and discordant sounds are everywhere about it.

The task of reviewing the history of Anesthesia was given to the worthy colleague who has preceded me. I am glad of it. Standing, as I feel myself to-day, overshadowed by names and memories; memories of blighted lives,—of mental wreckage,—of discouragements ending in suicides; what, but admiration of the sacrifices made; what, but desire to do homage; what else than these should or could fill a human heart on such an occasion? Here Cæsar can be praised, and Rome too.

A new good is an old gift,—Not new in ages past, only because channel was lacking. Electricity before chaos. An Edison the production of a Nineteenth Century. Euphrates, Tigris: both water Mesopotamia; both, alike, are the Persian Gulf. Not Armenia is the source; a common under-spring is the well constituting the Divine Afflatus.

My perceptions view Horace Wells as Euphrates and Tigris are viewed; he, and these, and all phenomena, not as things in themselves but as things in other things.

Whether or not this man was a meditative philosopher to be found oftenest in haunts apart from men, or whether or not he was simply a vessel capable of holding, but never trying to fill itself, I am alike without knowledge as without desire to know. He was filled, however. The river of Lethe found in him a channel. Everywhere over the land flows the stream Nepenthe. He is Nepenthe.

To change a metaphor: Is invention aught but filling a Form? Is this not a matter made plain by Plato two thousand years back? Are not forms eternal? Forms of things seen yesterday, to-day, and to be seen forever. Forms not yet seen. Is invention else than seeing a form and bringing it down from the sky to the uses of men? Materializing it, properly speaking. How as I grow old, do I grow

impressed with this: The maker of Forms, the All, the filler of Forms, simple instrument.

It is not even slight departure from the immediate subject of the occasion to make further reference to this matter of Forms, for it is not otherwise, according to my conception, that Horace Wells is to be either understood, appreciated, or called the discoverer of Anesthesia.

Was it truthfully Priestley to whom nitrous oxid owes its discovery? It assuredly was not to Horace Wells. Was, or was not, anything known of this gas before the days of our own Declaration of Independence? Or is it rather to be put thus: nitrous oxid is phenomenon deductively exposing itself to the chemist out of the droppings of camels upon desert sands; Ammon and Ammonia go back to Lybia.

No one has been, or is, greater than Plato. What the dung-burners did, or what Priestley has done, is not credited by him as Science, but simply as dealings had with phenomena. Science, he says, fritters itself, where its aim is otherwise than with the getting of knowledge of Noumenon.

Things unlike are not necessarily dissimilar. The things that lie within things are multitudinous. Who knows, even yet, what nitrous oxid is? Who knows even what water is? In a word, who knows what, or how much, anything is? Nobody.

But the scientist is the evolutionist. Possessing himself of means he analyzes. Analysis is one, or closely one, with deduction. Science has no thought, or word, or action, outside of matter.

But Forms, the true objects of science, as affirmed by Plato, constitute the invisible. The music of a musician is not his notes, the poet's inspirations are not grammar. Reality, or at least nearer approach to reality, is back of these. Notes are to be seen by anybody having eyes, and words are to be heard by anybody having ears. But what as to Forms, or Ghosts, as these are back of notes and words! What as to the Seers of these? No Forms being back of notes and words, there can be no notes and words in front of Forms.

Was not the ghost of Anesthesia with the camel-droppings? Was it not with the dudain, the devil's apple, of the Arab? Has it not been with alcohol since men distilled and knew this agent? Is it not with the poppy through all the ages that fields have been made red by this plant?

In 1540 the *oleum vitreoli dulce* was first given to the uses of men by Valerius Cordus. He had not the name, ether, for it, but his oil was, at its least, the basis of the ether of Frobensius, and the ether of to-day. Guthrie, Liebig, and Soubeiran simultaneously discovered chloroform in 1831. Did Cordus, in 1540, see or tell anything about a ghost of Anesthesia, as this lay in his sweet oil of vitriol? With chloroform filling the bottles of druggists, in 1831, was anybody to be found who had been introduced through its use to the wonderland of Euthanasia?

Let here the idea be repeated of nobody knowing what anything is. Cadmus, beyond all men of his times, saw letters. A Shakespeare, beyond all men of his times, saw use lying with letters. How many are the expressions lying with letters not yet seen by anybody? Forecast the unwritten poetry!

Here is culmination; and here is the place of Horace Wells in history. Horace Wells saw, in a room in Hartford, what had never before been seen by mortal man. He saw Anesthesia. It was ages before he was born that Ether was materialized, and it was before he was born that Nitrous Oxid was formulated, and it was when he was in no way thinking about such things that Chloroform was brought forth. The Seer saw Anesthesia. The sight lay, as I understand, with a hurt hand of which no complaint was made. Others, many others, saw the blooded hand. In a distant State, about the same time, I myself saw the hurt hand, but none, not one of the many others, saw Anesthesia. I think it is not to be denied that some saw a filmy halo that meant Anesthesia. There was a something, but what the something was the seers did not make out, and what was seen was seen only to be forgotten. Truly, Sir Humphry Davy is to be credited with a feeling of the elysium. Ego was differentiated for him by Nitrous Oxid from environment; but, while he felt, it was separability that was felt, not Anesthesia. His expression, on coming from under the influence of nitrous oxid, is familiar: "Nothing exists but thought."

Anesthesia, the thing being truly understood, is barrier between Matter, which does not feel, and Ego, which is percipient. It is not Matter that sees, hears, touches, or tastes. Does the matter, temporarily composing the cadaver of a dissecting room, see, hear, touch, or taste? Percipient is away from it; there is neither seeing, hearing, touching, nor tasting by a cadaver. A flute, separated from its player, is wood, having no *sing* in it.

I am not to credit Horace Wells with sight of separability. The "Me, and the not Me," is not likely to have been seen even by his internal eye. His Seership lay with a direction that people delight to call practical. Of many things, hundreds, thousands perhaps, lying with Nitrous Oxid, he saw one. But what a one! Here begins his glory. Here is to continue his glory. Here, so long as pain is esteemed hurtful, and absence of it pleasurable, will the name of Horace Wells be upon the lips of men.

Parallels recall obligations and glory due others. Apples have fallen since first apples began to grow and ripen. Kettles, in which water was being boiled for the evening repast, have opened their iron lips and tried for numberless centuries to say what they had to tell about locomotion. Over the earth and across the face of the heavens electricity has sought vainly, until latterly, for a Seer. The sun, with his rays full of perfect pictures, brought as free gifts to man, could find no taker.

In the year 1665 a Seer, sitting under a tree at Woolsthorpe, found himself able to hear fairly well what a falling apple had to tell about the moon staying where it belongs. Heron of Alexandria, holding his Egoistic ear to the spout of a kettle, heard a story of steam, and wrote it down in the shape of his æolipile, a so-called invention. Papin saw the cylinder. Fulton saw the steamboat. Stephenson was, perhaps, the first witness of a train of cars drawn by a locomotive. Thales of Miletus got a story of electricity from a piece of amber. Daguerre, not, however, until the age of the world A.D. 1839, was able to take what the sun had to give of pictures. Mozart, beginning with the use of common sense, and from this passing to the advantages lying with educated sense, dropped at the last both these and put down in form of notes what alone the flowers whispered to him,—having found out that Education is not alone the teller of things that are to be heard.

Not unnecessarily to detain; was Anesthesia, as Anesthesia, known to surgery before 1844 as it became known in that year, and since remains known? Not nitrous oxid, not ether, not chloroform, not rapid breathing, but, Anesthesia.

Who was the man of that year? Horace Wells.

This, it seems to me, settles the question.

Let, however, all deserved honor and glory associate with the names of workers and experimenters, as these have enlarged application of the inspiration of the Hartford Seer. Ether! Chloroform!

What would surgery do without them? How could the world do without them? How *did* the world do without them?

Here is other culmination. It is not necessary, in this presence, to enlarge, beyond a very few sentences, on the benefits of Anesthesia to humanity. Are not all here assembled doing, and experiencing, each after the manner of his work, what I did and experienced only yesterday. Upon the operating table of a hospital lay sleeping sweetly and quietly as ever baby slept, a member of our fraternity. In place of an ordinary neck was a tumor that reached from chin to sternum and from ear to ear. Wherever, as it proved, reaching fingers could reach, prolongations of this mass extended themselves. Salivary glands, trachea, carotid arteries, jugular veins, pneumogastric nerves, all were more or less embraced and wrapped about.—Yet, while so horrible a dissection as was required to remove the mass went on, sleeping and dreaming quietly continued, nor was any consciousness had by our brother of his terrible experience until an hour later he awakened snugly tucked away in one of the most comfortable of beds, the tender hand of a nurse wiping away the cold sweat-drops standing threateningly upon his forehead.

Consider, in contrast, a picture familiar before the day of Wells's inspiration. A mother, her heart welling out in tears, limbs trembling so as scarcely to afford her support, helpless misery marking her countenance, despair striking at her with its thongs of flame, follows into a hospital operating amphitheater a nurse who carries her first-born, which is being brought to the table. Alas! helpless indeed is the mother. How more than gladly, how a thousand times more than gladly, would she lie down in place of the child. Cries of mother and child moan through the hospital, and the least sensitive feels his cheek pale. The crucial moment has come. The child is placed and held by force upon the table. The mother is torn away. For a single moment eyes of mother and child have met in parting. A loud, frightened, despairing cry from the child rings from ceiling to floor of the room. The mother drops in a heap and is carried out a raving lunatic:—She raves about and curses God as being without pity or mercy.

Let a picture of to-day have relation with that other one of the past. One which extended, alas, from the days of the first surgical performance to the year of grace eighteen hundred and forty-four.

A mother brings to a hospital a child whose deformity requires the knife for its correction. Conscious of the power of Anesthesia, the

surgeon talks to the parent, while all the while the little patient, pleased and inveigled by the sweet smell of chloroform, is itself anesthetizing itself. The cutting is done. The child has a dream of roses and gardens and wide fields. The mother has placed in her arms her restored offspring. She has no tears, no words, her contact has been alone with beneficence. She is overwhelmed by the mystery met and passed. She says, "Our Father which art in heaven." She says and feels there is a God of pity and mercy.

Look at the name of the maker of these pictures of the new time! It reads,—Horace Wells!

To what extent Anesthesia has cultivated sensibility, I leave every surgeon to judge. Who, if suddenly transplanted into the olden times, being possessed of his present knowledge of anesthesia, could handle a knife without cutting everywhere else than where it would be desirable to cut, otherwise dying shortly out of sympathy for his patients. Could he say "Merciful Father which art in heaven," in place of thinking "Pitiless devil who is in hell." Alas! how near to hopeless Atheism may ignorance bring a man. Hail! that knowledge shows God and Father everywhere. Hail to all poets, to the music hearers, to the Seers of Forms of every kind! Let statues be stood for such in the squares! Let tablets of enduring brass mark their working places! Let us place, and hold them, with the immortals!

Hail to him who has proven to be, perhaps, the greatest of the Seers,—Horace Wells!

STANDING RESOLUTIONS.

The following standing resolutions are in force at this time, August, 1896:

Resolved, That henceforth no person shall be received as a delegate who is in arrears for dues, or until he has paid to the Treasurer the full amount due at the time his name was dropped for non-payment.

Adopted 1874.

Resolved, That hereafter no dental college shall be entitled to representation in this Association that does not require a good English education as a preliminary qualification for its matriculants, to be ascertained by examination.

Adopted 1879.

Resolved, That hereafter no society shall be entitled to representation in this Association that does not require its members to live up to the requirements of our Code of Ethics.

Resolved, When it comes to the knowledge of the Committee on Credentials that any applicant for membership is violating our Code, said applicant shall not be received, and all such applicants shall be referred by the Committee to the societies whose delegates they are, and in no case shall this Association be compelled to treat with violations of the Code, except where the violator is a member of this body and has no membership in any local society.

Adopted 1881.

Resolved, That the Secretary be instructed to assign members, who may neglect to make their own choice, the Section in which they are expected to work.

Adopted 1879.

Resolved, That the reports of Sections shall be called by the President in consecutive order, beginning each succeeding year one number higher than on the preceding year.

1879	commencing with	No. I.	1895	commencing with	No. III.
1885	"	" No. VII.	1896	"	" No. IV.
1886	"	" No. I.	1897	"	" No. V.
1892	"	" No. VII.	1898	"	" No. VI.
1893	"	" No. I.	1899	"	" No. VII.
1894	"	" No. II.	1900	"	" No. I.

Adopted 1879.

Resolved, That a paper presented to the Committee on Voluntary Essays and by them considered and returned to the writer with notification that the said paper is not accepted, cannot afterward be read before the Association unless it is made the special order by resolution adopted.

Adopted 1885.

It shall be the duty of the Executive Committee of the Association to provide at the opening of each annual meeting a book for the registration of members or visitors as they arrive, which shall also give place of residence and hotel where each may be found.

Adopted 1886.

Resolved, That in the future this Association discountenance the giving of banquets, excursions, entertainments, etc., by local professional societies or individuals, either during or at the close of our annual meetings.

Adopted 1886.

Resolved, That it shall be the duty of the Chairman of the Credentials Committee to procure and keep a book wherein each delegate who wishes to be considered a permanent member of this Association shall enter his name.

Adopted 1886.

Resolved, That it is unprofessional to use on cards or signs anything except name, title, and address.

Adopted 1888.

Resolved, That any member of the dental profession who has been in reputable practice for a period of fifty years may be elected to permanent membership in this Association without the payment of dues; and any member of this Association who has been in practice for a like period shall have his dues remitted thereafter by presenting the fact to the Treasurer of the Association.

Adopted 1889.

WHEREAS, The National Association of Dental Faculties has passed a resolution adopting a three years' course of instruction after matriculation as essential to graduation; therefore

Resolved, That in the future no dental college shall be represented in this Association that does not comply with the course of instruction adopted by the college association named.

Adopted 1889.

Resolved, That this Association now in session direct that Sections belonging thereto shall in the future be prohibited from inviting individuals who are violating the Code of Ethics to hold clinics or to give other exhibitions before this body.

Adopted 1891.

Resolved, That a permanent Standing Committee on Necrology be appointed, to consist of five members, whose duty it shall be to act, without further instruction from this body, as occasion may require, and report to the annual meeting of the Association.

Adopted 1891.

WHEREAS, Section I has been unable in recent years to obtain sufficient matter to make a proper report; and

WHEREAS, It is the opinion of the Section that it is properly entitled to papers on crown-work, bridge-work, and orthodontia; therefore, be it

Resolved, That hereafter all papers on these subjects shall be submitted to Section I.

Adopted 1892.

Resolved, That a Standing Committee, to be styled the "Committee on State and Local Organizations," and composed of three members, shall be appointed, originally for terms of one, two, and three years respectively, and that all vacancies due to expiration of term shall thereafter be filled for terms of three years. All vacancies occurring from any other cause shall be filled for the unexpired term.

The basis of the plan and scope of work of said Committee, and its duties in relation thereto, shall be the suggestions as set forth in the address of the President of the American Dental Association for the year 1892; also the articles from which he quotes, and in harmony with the circular letters issued by the Chairman of the Executive Committee.

Adopted 1892.

Resolved, That two general addresses be delivered annually, on the second and third days' meetings, on some general topics of interest to the whole profession, the subjects to be selected by the third division of the Executive Committee, the first division of the Executive Committee to nominate the essayists annually.

Adopted 1894.

Resolved, That a Standing Committee of nine be appointed, to be known as the Committee on Terminology, whose duty it shall be to prepare and submit a carefully prepared report at each annual meeting of this Association.

Adopted 1894.

Resolved, That this Association believes the conferring of honorary degrees in dentistry to be detrimental to the profession of dentistry, and hereby expresses its disapprobation of the practice.

Adopted 1895.

Resolved, That a committee of three be appointed by the chair to cooperate with the Army Medical Museum and Library managers in enriching

its stores of dental literature and museum specimens, especially by appealing to dental societies and individual members of the dental profession for material assistance.

Adopted 1895.

Resolved, That the American Dental Association condemns the use of secret preparations known as "*local anesthetics*," as well as all other secret preparations.

Adopted 1895.

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